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PC WORLD

May 1995

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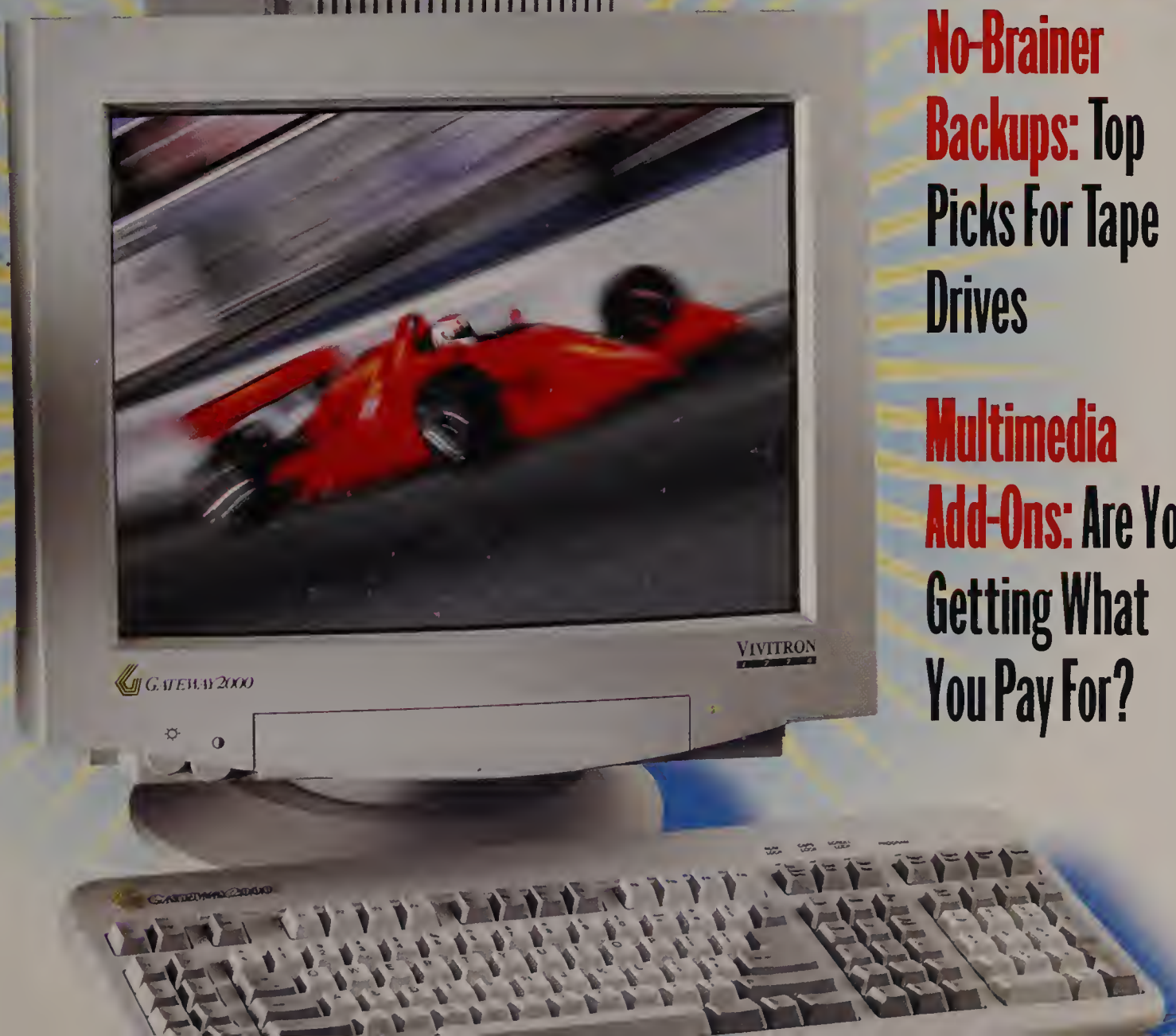

PLUS

Dirt Cheap Software: 28 Top Programs and How to Get Them

Software SOS: Who Should You Call For Help?

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Multimedia Add-Ons: Are You Getting What You Pay For?

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For Sweepstakes Details, See Page 308

No Purchase Necessary

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AND THINGS HAVEN'T BEEN THE SAME SINCE.

If there is one thing we all have in common, it is a need to express ourselves. For some folks in Wyoming that need gets met every time they tune in to National Public Radio's® *The Thistle & Shamrock*® show, which airs Saturday evenings on Wyoming Public Radio. (Just tune in to 91.9 on your FM dial.)

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For such a job they'd surely want to add charts and graphs. They'd want to drag stuff from one document and drop it into another. They'd want automatic formatting. They'd want to whip up a table of contents. Simply put, they'd want to make their point so well that the station's staff would be happy to change their programming. And why shouldn't they be? NPR already knew how it would make their listeners feel.

Of course we're not going to say Chugwater would have turned into a cultural wasteland if it weren't for *The Thistle & Shamrock* show. We're just saying that the more clearly you get your point across, the more likely it'll be heard. (Something to think about next time you're looking for a raise.)

And now for a few words from our sponsor: If you'd like to hear a little more about Microsoft Word 6.0 or any of the other fine products that make up Microsoft Office, just give us a call at (800) 240-4782, Department NEC. We're sure you'll be impressed with the reception.

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PC WORLD

Cover Story

64 New Highs: Pentiums Speed to 120 MHz

Is faster really better? Do CPU-hungry applications like multimedia presentations, video conferencing, and CD-ROMs validate the need for speed? *PC World* put preproduction 120-MHz systems from Dell, Gateway, HP, Micron, and Zeos to the test. With price tags starting at around $3700, some of these systems performed over 30 percent faster than the average P-100, but at a price—$500 more than the cost of an average 100-MHz PC. Is the 120-MHz PC the answer nevertheless? Or is the more affordable 100-MHz system the best choice for business buyers—for now? Plus a peek at how much you should expect to pay for today's systems when the latest chips become available.

Cover Photography: Robert Cardin; Screen: William Sallaz/The Image Bank; Banner: GALA/Superstock Inc.

Bargain Software

118 Software for Next to Nothing

They're low-cost or no cost, and available online. We scoured cyberspace and picked 30 great affordable products, including a powerful calculator, communications add-ons, a desktop publisher and other programs you can buy without busting your budget. Plus editors' favorites and where to find it all—online and elsewhere.

Tape Backup

128 No-Brainer Backups

It's simple: Packed with enormous storage capacity—up to 1.4GB per cartridge—today's tape drives make it easier than ever to back up a whole hard drive. Our reviewer found systems that were affordable, automatic, and easy to learn and use.

Software Support

142 The Hidden Cost of Tech Support

Worried about installation problems and error messages? You need tech support. But what is the best way to get help? We surveyed readers and service experts, make recommendations for all needs, and tell you if tech support from independents and PC vendors is good enough.

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68 Feds Target the Internet

Legislation set to deregulate telecommunications should accelerate Internet growth. But some bills, particularly morality legislation, could make even casual users subject to criminal charges, derailing the rush of businesses to the Net.

70 Buyer Beware: Inflated Claims, Unmet Promises

Many PC vendors are playing fast and loose with their product specs. *PC World* found a consistent pattern of exaggerated claims. Here's how to avoid being duped.

76 Are We Having Fun Yet?

While CD-ROM sales skyrocket, return rates as high as 40 percent are reported.

Systems

182 Top 20 PCs: 100-MHz Face-Off
Our Top 20s heat up as PCs by the dozen hit 100-MHz speeds, from pricey Pentiums to a new AMD DX4-100 budget contender. Add big price drops as Intel slashes prices and AMD and Cyrix bring on competitive chips, and you have the best values ever. This month's champs: the Dell Dimension XPS P90 and XPS P75, the Toshiba T4900CT, and the WinBook XP SX-33 Monochrome.

Software Support

142 The Hidden Cost of Tech Support
Worried about installation problems and error messages? You need tech support. But what is the best way to get help? We make recommendations for all needs and tell you if software support from independents and PC vendors is good enough.

Conferencing

161 No More Meetings?
Have meetings overrun your workday? Do E-mail discussions go on and on? Conferencing software promises to help you exchange ideas so discussions are easy to follow and produce results. Our Best Buy combines the best of the rest.

Reliability & Service Monitor

229 Win a Micro Express MicroFlex-VL/80
How satisfied are you with your PC? Fax in this survey for a chance to win a Best Buy system from this month's Top 20s.

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Diamond Stealth board sneaks up on STB with a top score in our tests.

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PC World agrees: "Mark a new high on the performance chart!" They said the Pentium-66 and Pentium-90 processor-based Pantera PCs were "the fastest system(s) ever tested."

What makes the Pantera the top performer—time after time? Superior engineering—starting with a ZEOS designed motherboard created specifically to take full advantage of the latest technological advancements. The motherboard is loaded with exceptional features such as an on-board PCI Local Bus Enhanced IDE Controller and support for up to four IDE devices. And for the fastest video performance, the Pantera includes a 64-bit Diamond Stealth PCI video card standard.

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PC MAGAZINE EDITORS' CHOICE — Pentium-66 April 12, 1994; DX4-100 June 28, 1994

COMPUTER SHOPPER — Pentium-60 April 1994; Pentium-90 August 1994

PC WORLD BEST BUY — 486DX2-66 January 1994, February 1994, March 1994, June 1994, December 1994, January 1995, February 1995, March 1995, April 1995; DX4-100 October 1994, November 1994, December 1994; Pentium-60 December 1994, January 1995, February 1995, April 1995; Pentium-66 June 1994, July 1994, August 1994, September 1994; Pentium-90 August 1994, September 1994, October 1994, November 1994, January 1995, February 1995

PC Magazine Best — Pentium-66 May 1994; Pentium-90 February 1995

Windows Sources Experts' Pick — Pentium-66 June 1994; Pentium-90 August 1994

Windows Magazine 1994 Recommended — Pentium-90 November 1994

1994 Win Award W 100 Windows Magazine — 486DX2-66 March 1994

Package 1		Package 2		Package 3	
486DX2-50	$1295	486DX2-50	$1595	486DX2-50	$2095
486DX2-66	$1345	486DX2-66	CN! $1645	486DX2-66	CN! $2145
DX4-100	$1545	DX4-100	$1845	DX4-100	CN! $2345
Pentium-60	$1645	Pentium-60	CN! $1945	Pentium-60	$2445
Pentium-75	$1695	Pentium-75	CN! $1995	Pentium-75	CN! $2495
Pentium-90	$1995	Pentium-90	$2295	Pentium-90	CN! $2795
Pentium-100	$2195	Pentium-100	$2495	Pentium-100	$2995
Pentium-120	$2595	Pentium-120	$2895	Pentium-120	$3395

Package 1
- 4MB RAM
- 340MB local bus IDE hard drive with 120K cache
- 3.5" 1.44MB floppy disk drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- ZEOS 14" 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11

Package 2
- 8MB RAM
- 528MB local bus IDE hard drive with 120K cache
- **4X CD-ROM** drive and 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- ZEOS 14" 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11

Package 3
- 16MB RAM
- **850MB** local bus IDE hard drive with 256K cache
- **4X CD-ROM** drive and 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus SVGA color graphics card with 1MB DRAM
- **ZEOS 15"** 1024 x 768 non-interlaced SVGA color monitor, .28mm dot pitch
- Six-bay desktop case with two cooling fans
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11
- **Lotus SmartSuite**

Hottest:

Pentium-90	CN! $3095
Pentium-100	CN! $3295

- 16MB RAM, 256K SRAM cache
- 1GB local bus IDE hard drive with 256K cache
- **4X CD-ROM** drive and 3.5" 1.44MB floppy drive
- **Diamond Stealth 64-bit** PCI local bus color graphics card with **2MB VRAM upgrade**
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- **10-bay vertical case**
- Microsoft Mouse
- MS-DOS 6.2, Windows for Workgroups 3.11
- **Lotus SmartSuite**

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Pentium-100	CN! $3995

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While each Meridian product is distinct, they all have several hot features that add to their impressive speed and ease of use including local bus video; a comfortable palm rest with an integrated TruePoint™ pointing device; and an 84-key keyboard.

Meridian 400 Subnotebook

At 3.9 pounds, the Meridian 400 subnotebook is molded from a special carbon-fiber material that cuts weight and improves durability. And with your choice of a 486DX2-50 or DX4-100 processor, hard drives to 350MB, and RAM that's user upgradable to 20MB, this notebook is "faster than a speeding desktop," as *Computer Shopper* said.

PC World agrees: "Featherlight, blazingly fast, elegantly designed… richly deserves its Mobile PCs power ranking."

The 400 features three screen options: active color and dual-scan color or monochrome. You also get two Type II PCMCIA slots and an external ultra-light (9 oz.) 3.5" 1.44MB floppy drive (included in Packages 2 and 3).

Meridian 800 Notebook

"With it's sleek styling, solid construction and hot performance, the Meridian 800C justifiably earns it's place at the top…." reported *Windows Sources*.

We couldn't agree more! At 6.3 pounds, the Meridian 800 full-size notebook is light enough to travel anywhere yet it's large enough to use for presentations and everyday computing. And with your choice of a 486DX2-50 or DX4-100 processor, removable hard drives to 350MB, and RAM that's user upgradable to 20MB, this notebook is the raciest thing around.

For your viewing pleasure, the 800 is available with your choice of color displays—a whopping 10.3" dual scan or 9.5" active. You also get two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

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viewing, the 850 is available with your choice of color displays—a mammoth 10.3" (800 x 600 resolution) dual scan or 9.5" active matrix. You also get integrated audio with 16-bit stereo sound (Sound Blaster Pro compatible) for the best in portable multimedia, two Type II or one Type III PCMCIA slots, and an internal 3.5" 1.44MB floppy drive.

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486 & DX4

Package 1			Package 2			Package 3		
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486DX2-50	**$1995**	**$2295**	**486DX2-50**	**$2295**	**$2495**	**486DX2-50**	CN! **$2595**	CN! **$2795**
DX4-100	**$2395**	**$2695**	**DX4-100**	**$2695**	**$2895**	**DX4-100**	CN! **$2995**	CN! **$3195**
Active Color	**400A**	**800A**	**Active Color**	**400A**	**800A**	**Active Color**	**400A**	**800A**
486DX2-50	**$2695**	**$3095**	**486DX2-50**	**$2995**	**$3295**	**486DX2-50**	CN! **$3295**	CN! **$3595**
DX4-100	**$3095**	**$3495**	**DX4-100**	**$3395**	**$3695**	**DX4-100**	CN! **$3695**	CN! **$3995**
➤ 4MB RAM ➤ 175MB IDE hard drive ➤ 800: Internal 3.5" 1.44MB floppy drive ➤ MS-DOS 6.2			➤ 4MB RAM ➤ 260MB IDE hard drive ➤ 3.5" 1.44MB floppy drive, 400: External, 800: Internal ➤ Custom carrying case ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ Lotus Organizer			➤ 8MB RAM ➤ 350MB IDE hard drive ➤ 3.5" 1.44MB floppy drive, 400: External, 800: Internal ➤ Custom carrying case ➤ Extra battery ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ Lotus Organizer		

Pentium

Package 1		Package 2		Package 3	
Dual Color	**850C**	**Dual Color**	**850C**	**Dual Color**	**850C**
Pentium-75	**$3495**	**Pentium-75**	**$3995**	**Pentium-75**	**$4395**
Active Color	**850A**	**Active Color**	**850A**	**Active Color**	**850A**
Pentium-75	**$4295**	**Pentium-75**	**$4795**	**Pentium-75**	**$5195**
➤ 8MB RAM, 256K SRAM cache ➤ 528MB IDE hard drive ➤ Internal 3.5" 1.44MB floppy drive ➤ Integrated audio ➤ MS-DOS 6.2, Windows for Workgroups 3.11		➤ 16MB RAM, 256K SRAM cache ➤ 528MB IDE hard drive ➤ Internal 3.5" 1.44MB floppy drive ➤ Integrated audio ➤ Custom carrying case ➤ Extra battery ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ Lotus Organizer		➤ 16MB RAM, 256K SRAM cache ➤ **810MB** IDE hard drive ➤ Internal 3.5" 1.44MB floppy drive ➤ Integrated audio ➤ **14.4 PCMCIA fax/modem** ➤ Custom carrying case ➤ Extra battery ➤ MS-DOS 6.2, Windows for Workgroups 3.11 ➤ Lotus Organizer	

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- ➤ PCMCIA slots. 400: 2 Type II, 800 & 850: 2 Type II or 1 Type III.
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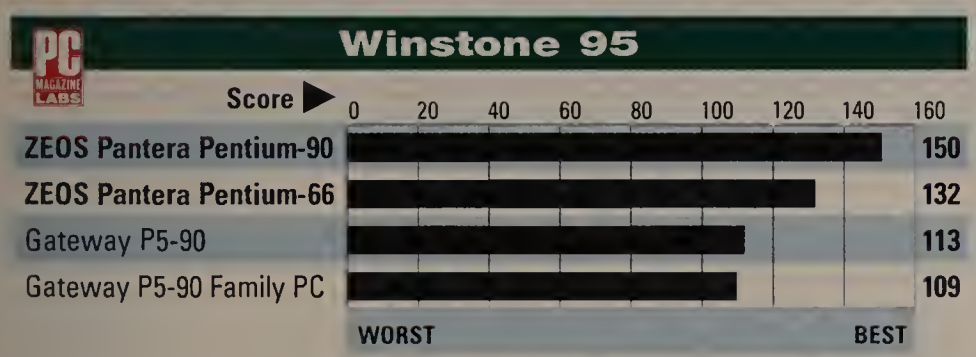

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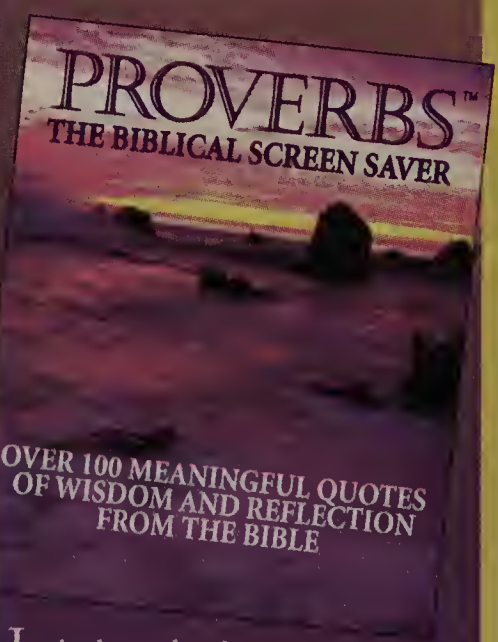

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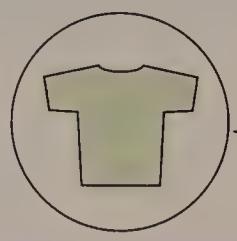

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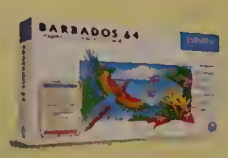

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A Reason to Go Online: Cheap Software

In the last year, PC users have migrated online in unprecedented numbers. About 6 million people now subscribe to America Online, CompuServe, and Prodigy. At least 20 million log on to the Internet. And if Microsoft has its way, within a year an estimated 6 million people will join the forthcoming Microsoft Network, to be bundled with Windows 95.

Why is everyone rushing online like lemmings? Fear of missing out on something, for one. But by most accounts, one of the most popular reasons for going online is to download software. The range of available files is as staggering as the number of people logging on: You can get everything from software patches to updated drivers for video boards to all manner of shareware and freeware. It's cheap, and it's instantaneous.

There's a twofold problem: Where do you find software online, and how do you know if it's any good? In this issue, we help you out. Associate Editor Lincoln Spector assigned two of our writers the task of scouting out the most useful, low-cost utilities, add-ons, specialized applications, and files. The result of their search is "Software for Next to Nothing," a compendium of 30 programs—most of them under $20 or free—to fill the gaps in your collection of standard business applications. Our writers also point you to the best places on CompuServe and America Online to find additional software.

For convenience, you'll find all the shareware and freeware in the PC World Online forums on America Online (keyword **pc world**) and CompuServe (**go pwoforum**). If you don't subscribe to either service, dial in to our bulletin board system in San Francisco at 415/974-7303. All the software is also available on disk for a nominal fee (see the article's accompanying sidebar "Where to Find These Programs").

Support Report

In general, one disadvantage of low-cost shareware and freeware is lack of technical support to help you resolve common problems: bugs, difficulties using particular features, installation or upgrade hang-ups, and interoperability problems with other applications or with your operating system. In the case of major business applications, the cost of providing support continues to escalate, and you pay for that support either directly through a payment plan of your choice or indirectly as part of the cost of the software. But do you get what you pay for? Are help lines answered promptly? Is the information accurate? How quickly do technicians solve your problem? Should you turn elsewhere for more cost-effective software help?

Senior Editor Roberta Furger, Associate Editor Christina Wood, and the *PC World* research department set out to answer these questions by conducting a random-sample survey of our subscribers. They asked readers about the quality of support from major companies selling business and home applications: Aldus, Borland, Broderbund, Corel, Intuit, The Learning Company, Lotus, Micrografx, Microsoft, Software Publishing, and WordPerfect. They made anonymous calls to the growing ranks of third-party support providers and talked to executives at PC vendors like Compaq and Gateway that now offer support for applications they bundle with their computers.

In "The Hidden Cost of Tech Support," Wood and Contributing Editor Daniel Tynan report on just how well all these players solve problems. Major software companies are to be commended for the quality of support they provide, but not all companies we investigated fare so well. Read our recommendations for the best support options for home users, small companies, and large corporations.

It's in the Mail...

In the April issue, *PC World* introduced a column called *Full Disclosure*. The author, Stephen Manes, has written about PC products since 1982 and is also a computer columnist for the *New York Times*. The goal of this column: to take a hard look at products, services, and issues and examine the reality behind the hype and promises. Last month, Manes tackled Microsoft Bob. This month, he reveals a little-known problem with E-mail: You assume the message you send through your corporate network, an online service, or the Internet gets there quicker than U.S. mail—but does it? Not necessarily, Manes reports, citing delays of up to a day and a half for one of the major online services. We think Manes adds a welcome reality check to our pages. Let us know what you think.

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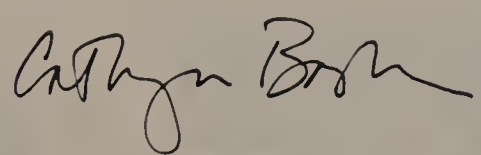

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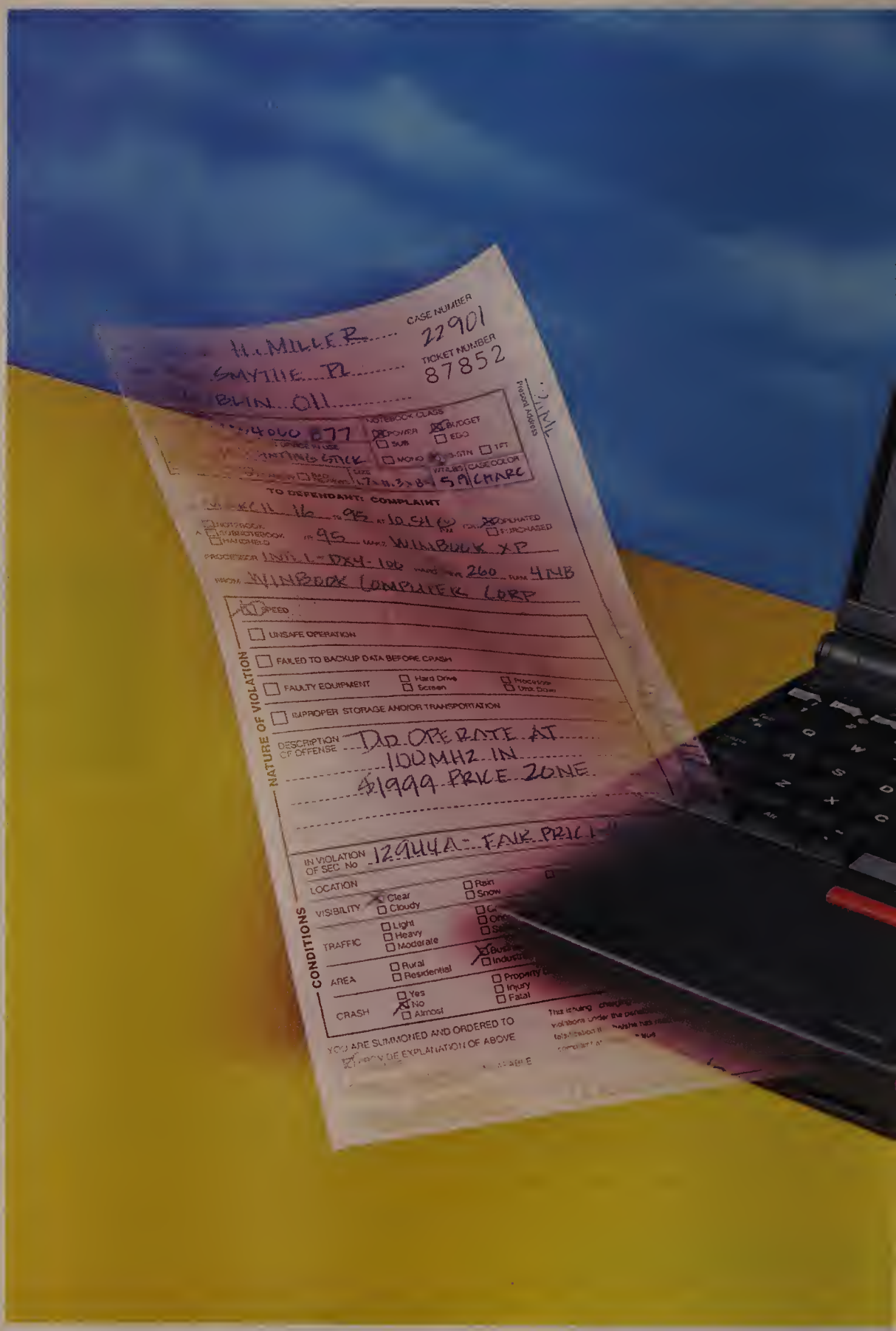

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DOS Applications	Good	Good
Road Warrior	Good	Fair
Desktop Replacement	Good	Good
TFT 100 MHz, 8MB RAM, 450MB HDD	$3918	$6490

"While Panasonic's CF-V21P boasts a built-in 3.5-inch CD-ROM drive, the CD-BOOK is the first to include an industry-standard, double-speed, 5.25-inch CD-ROM drive, which means users can access the more than 10,000 CD-ROM titles available."

PC LapTop
— PC LapTop, Dec. '94

"MPC CD-BOOKs are the closest we've come to real desktop replacements. They are the first true, self-contained portable multimedia machines"

PC Magazine
— PC Magazine, Dec. 6, '94

"The full-sized, top-loading CD-ROM drive on MPC's CD-BOOK 800 performs as well as or better than CD-ROM drives designed for desktop systems."

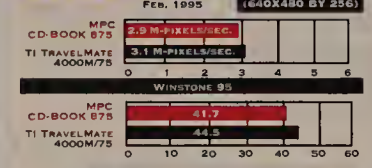
PC Computing
—PC Computing, Jan. '95

"The MPC CD-BOOK™ 800 is a well designed, relatively low-cost multimedia notebook from MPC. At 6.8 pounds, the CD-BOOK 800 is a very compact and lightweight package that also features a colorful industrial design."

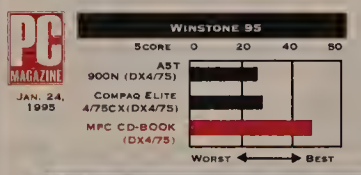
Mobile Office
—Mobile Office, Feb. '95

Computer Shopper, Feb. 1995

MPC CD-BOOK 875 ZO WinBench Graphics WinMark 95 (640X480 BY 256)



PC Magazine, Jan. 24, 1995



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MPC 16MB RAM Card Upgrade	Call!

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MPC's 799 Super Package: DOS, Windows for Work Group, 1 extra NiMH battery, car adapter, external charger, 14.4 fax/modem PCMCIA card & Targus case	
TFT Active-Matrix 100MHz, 8MB RAM, 524MB HDD	$3,520
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Circle 190 on reader service card

Red Alert–All Hands to Battle Stations

Warp Fan Weighs In

I must commend you—"OS/2 Warp vs. Windows NT 3.5" (*Top of the News*, March) was a wonderful idea for an article. But far from being an objective appraisal, your write-up struck me as somewhat uninformed.

Consider Lincoln Spector's opening paragraph: How can he purport to explore whether either product is a better choice than vaporware? Spector compounds this frivolous speculation when he claims Windows 95 won't have a driver availability problem. Windows 3.11 still has the occasional driver availability problem.

It was just plain ignorant to label the OS/2 interface counterintuitive. The Windows interface is not inherently intuitive; it's just that we've all gotten used to its conventions. And OS/2 is nothing if not easily configurable. It is a relatively simple matter to reconfigure the mouse buttons and other interface attributes to suit the user. The fact that Microsoft has borrowed many of the Warp shell's conventions for the beta releases of Windows 95 testifies to the value of the Warp interface.

Regarding Spector's statement—"But Warp's object-based approach is botched by the clumsy way the OS handles the day-to-day details...when you minimize a window, it disappears—hiding in a folder"—I didn't like the Minimized Window Viewer either. Nor do I like icons piling up at the bottom of my screen.

At least Spector noticed that Warp gives the user the choice of placing Windows applications in separate sessions or letting them share one or more DOS sessions. This is precisely the point that he should have gotten overall: Warp gives you choices. If you don't like the way a thing works, it's easy to make it work the way you like.

So, Lincoln Spector, go ahead and wait for Windows 95. Me, I'm productive now with OS/2 Warp.
Bruce Carothers, Internet

Author's response: I never said Windows 95 won't have driver availability problems. I said it probably won't have the sort of compatibility problems that make installing OS/2 and NT difficult. I've seen beta versions of Windows 95 work with existing hardware far more smoothly than Warp does. And as I mentioned, Windows 95's driver compatibility comes at a price.

I've seen enough people struggle with OS/2 to feel justified in calling it counterintuitive. Windows' interface is also difficult, but the point is, we have gotten used to it. Although I've spent far more time in Warp than in Windows 95 beta, I've found the Windows 95 interface much easier and more intuitive. And if you have to configure your mouse to make it "intuitive," it's not intuitive.

I should mention that in last-minute copy fitting, the end of the article was cut in a way that changed the meaning. What I wrote was, "If you can live with Windows' limitations—the not-quite-real multitasking, the short file names, the occasional crashes—your best bet is to do so, at least until Windows 95 comes out and you can judge all the players in their final form."

I did make three technical errors in the article. I said Windows NT can't run multiple Windows 3.1 apps in the same virtual machine or shared memory; I've since discovered I was wrong. The statement that a DIR command in OS/2 will not show you long file names is true only in a DOS (as opposed to an OS/2) command line session. Finally, the $99 upgrade price for Windows NT applies only to Windows NT 3.1 users. I regret the errors.
—Lincoln Spector

Love the One You're With

Thanks for your balanced reporting in "OS/2 Warp vs. Windows NT 3.5." The promise of something new and exciting can distract attention from what's available and working right now.

Top of the News

OS/2 WARP VS. WINDOWS NT 3.5

Is Buying Either Better Than Waiting for Windows 95?

If you can't stand another day living with Windows 3.1 and crave the advantages of a 32-bit operating system, you now have two choices. But be warned—it's a decision not to be made lightly.

Breaking News

If we all installed a 32-bit operating system tomorrow, we would still be using our old 16-bit software and it would not run any faster. A change of this magnitude will take a lot of time—the multitude of standards that need to be addressed are changing almost daily. The hardware, operating systems, and software we are using right now are awesome in their capabilities, and we need reviews to help us use what is currently available. So I want to thank you for keeping your eye on the ball.
Dirk Andersen, Internet

Divided We Fall

The now-infamous Intel Pentium calculating problems may be small potatoes to some, but to users of my company's software it could mean big trouble. Floating-point arithmetic makes

PHOTO ILLUSTRATION: JEFF BERLIN; ILLUSTRATION: JEFFREY PELO

Create multimedia presentations.
Crunch financial planning scenarios.
Manage complex documents.
Share ideas face to face.
Etc., etc., etc.

Today's business software, from suites to groupware, places great demands on your PC. And with even more sophisticated programs already being developed, that demand is only going to increase.

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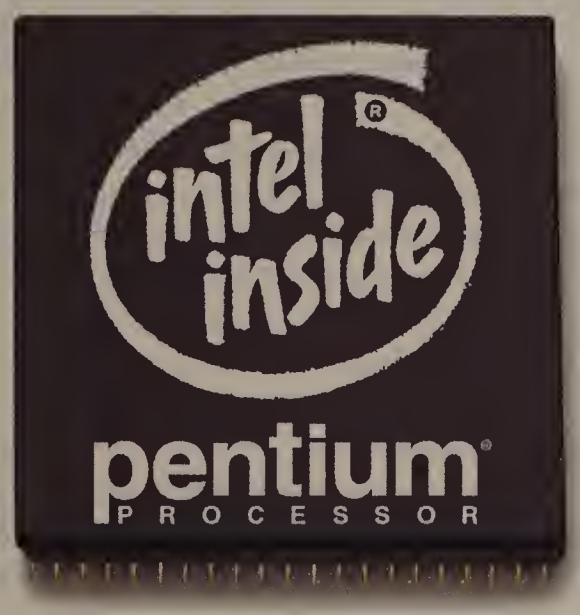

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possible the fast and precise calculation of geographic distances, the task at the heart of our product, Hipparchus. Without 15-digit accuracy, Hipparchus would not get the right answer, which might result in, for example, a waterworks constructor mistakenly digging up a gas line. Unfortunately, users are not likely to realize their applications depend on floating-point calculations.
John Russell, president, Geodyssey Limited

Socket Set

I had to let you know that a *PC World* article helped me get my modem card working ["PC Cards: Is Plug and Play Here?", *Top of the News*, February]. After struggling for two days, I read your article, which essentially said to use the card and socket services that came with my notebook, as their settings may be specific to my system. So I dutifully uninstalled the modem card and socket services, reinstalled the notebook ones, and Glory Oscar—after a little manipulation, they worked and I was online. Thanks.
Shirley A. Ryan, CompuServe

Sleeping Sickness

February's *Consumer Watch* discussed why we should buy Energy Star–compliant PCs. A nice column, but unfortunately its premise—that there's no reason not to buy an Energy Star PC—doesn't mesh with my experience of the Energy Star menace.

Take my office PC (please!). Each Energy Star feature is annoying. If I turn on the monitor's power-saving features, I can look forward to several seconds of readjustment as the monitor stretches from its long nap.

Even more grievous is the hard drive, which goes to sleep after 10 minutes and takes several seconds to recover. Although I've turned off every Energy Star feature on the system, it doesn't help.

When manufacturers figure out how to make these components wake up in a reasonable period of time, wake me up.
Kendall Gelner, Internet

Deduction Disputed

In "Tax Software Tips and Gaps" [February, page 158], under "Automobile License Fees," you criticized packages for not carrying the remaining (personal) portion to Schedule A. Any good tax software would not do so, as the personal portion is not an allowable personal deduction (see IRS Publication 17, page 233, "Nondeductible expenses"). I hope you didn't mislead readers into deducting these fees.

It *is* important, as you imply, to make sure that any tax software you use carries items correctly from form to form. Blind trust of these packages may subject one to an unhappy audit experience.
Harry Meier, Homewood, Illinois

Editor's response: According to our tax consultant for the review, the license fee has two components: 1) Registration fee: The personal, nondeductible fee paid to the Division of Motor Vehicles for auto registration is the "Fees and licenses, such as car licenses..." that Meier noted in his letter. (A portion of this item may be deductible as a business expense if you use your automobile for business.) 2) License fee: This is deductible as a personal property tax, per Publication 17, page 178.

None of the programs reviewed recog-

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nized the license fee as a personal property tax in Schedule A; that's the "tax gap" we criticized. —*Melissa Riofrio*

More Than Satisfied

An item in *Keeping Up* [*Consumer Watch*, February] about a class-action suit filed against Good Times Home Video and id Software struck a nerve. I was a prerelease purchaser of Doom II. For $49, I got the game, a survival guide, and a T-shirt. I later got two letters apologizing for any delay in receiving Doom II and any potential disparity between prerelease and retail prices. I was offered a Doom II CD-ROM, a $10 rebate, or a full refund.

For my overpayment of $10, I have received more than three times that amount in merchandise. Have the people filing the lawsuit nothing better to do?
Stevan Makarevich, Phoenix

Quick-and-Dirty Reports Revisited

Yes, David Johnson, you *can* copy pictures from a CD-ROM into a report [*Letters*, "Quick-and-Dirty Reports," February]. Press <Print Screen> to copy your screen. Open Windows Paintbrush and paste the screen there. Use the rectangular box tool to outline the image, and Copy To a new file. Insert the file in a frame of your report, and voilà! (The screen copy is also a nifty tool for spot-printing text from a CD-ROM. When printed directly from the program, text is often faint and hard to read. But if you copy the screen to Paintbrush and then print, you'll get exactly what you see on the screen. Try it!)
Paul Glassman,
Westmount, Quebec, Canada

Corrections and Clarifications

In January's *New Products*, we mistakenly stated that Executive Telekit comes with about 40 foreign phone plugs. In fact, it comes with one United Kingdom adapter; the full set of 37 adapters (for use in over 180 countries) costs an additional $449.99.

In January's *Help Line*, we listed incorrect telephone numbers for SPEA Software in Germany. The correct numbers are 011-49-8151-266-0, 011-49-8151-266-58 (fax), and 011-49-8151-266-241 (BBS).

The photos for the Lexmark Optra R and the Texas Instruments microLaser PowerPro in "Laser Printers: The Price Is Right" (February) were transposed, as were the text and line-art print samples for the Lexmark Optra R and the Brother HL-630. A Best Buy icon was mistakenly placed next to the Hewlett-Packard LaserJet 4M Plus; this printer did not win a Best Buy award. The Digital Equipment DEClaser 3500 was shipped to us without an optimized PostScript driver; however, this model does have an optimized driver that gives it enhanced PostScript functionality.

In our March review of the Hertz P90e in "Top 20 PCs: The Pentium Turns 100," we reported incorrectly that Hertz Computer's support is subpar. Hertz provides a toll-free technical support line 10 hours per workday; 24-hour, seven-day pager support; and a $495 on-site service option.

PC World regrets the errors.

Letters welcomes your responses and ideas. *See page 12 for contact information.* ■

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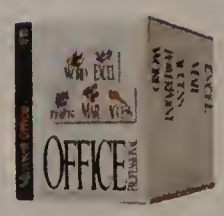

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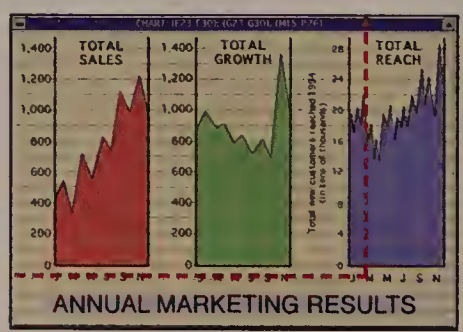

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Neither Snow, Nor Rain, Nor Heat, Nor Gloom of Night...

After years of slaving away on a slow and cranky 386, you decide to take advantage of falling PC prices and buy a Pentium-90. Following endless hours of research and comparison shopping, you decide on a highly rated multimedia system. You call in your order, rattle off your credit card number, and then wait eagerly for your new computer. And you wait, and wait, and wait.

Sound familiar?

It could, if you bought a new PC from just about any leading manufacturer. Approximately 26 percent of the respondents to *PC World's Reliability & Service Monitor* between July and December of 1994 said it took more than three weeks to get their PC. Mail-order customers and those buying from a value-added reseller waited longest.

Made-to-Order, Made to Wait

To be fair, if you want a standard-configuration 486, the waits are short, with the vast majority of systems arriving in one or two weeks; many respondents reported getting their PC in less than a week. Longest delays were for Pentium systems, where the high volume of sales and customizing has resulted in a backlog at many companies. Many customers are willing to wait an extra week or two to get their ideal system. Problems arise, though, when sales representatives give vague or inaccurate delivery dates at the time orders are placed, leaving customers hanging as the days and weeks tick by.

To get a feel for what customers are told when they place an order, I made some calls to the leading mail-order companies: Dell, Gateway, Micron, and Zeos. Posing as a would-be buyer of a standard-configuration Pentium-90, I asked a few questions: Is the system in stock? How long until I receive my order? Will I be notified of a delay? The answers were illuminating.

First, unlike what happens when you place an order with J. Crew or Williams-Sonoma, don't expect to get a precise delivery date for your new PC. Most mail-order companies don't have a huge inventory of PCs, so they can't ship out your new Pentium the same way J. Crew ships out your new wool sweater. And because they build their PCs to order, PC companies are loath to give out precise delivery dates. Except for Zeos, that is—its sales rep told me he had 22 Pantera Pentium-90s in stock. He promised delivery in three days if I ordered that morning. (In fact, Zeos guarantees that if you don't get your PC by the stated time, it'll refund your shipping charges. Not bad.)

Dell, Gateway, and Micron all warned me of a two- to three-week delay, depending on the unit. I pressed each for an exact date. No one would give me one. Gateway's rep said the system—a P5 Family PC—would ship "on or before March 1" (12 days after I ordered it), but when I asked if she could guarantee that date, she said no. "If we run out of components, it could take even longer—though that doesn't happen often," she added. Any chance of putting a rush on the order, I asked? "Not even for my own mother," was her answer.

Next I asked the companies what would happen if they missed their rather vague delivery dates. Dell and Gateway both said I'd be contacted if my PC didn't ship within the stated time—Dell said I'd get a call; Gateway sends a card. The Micron sales rep, on the other hand, said, "Frankly, ma'am, we don't [contact you]. We've got too many orders to do that."

It's Not a Courtesy, It's Your Right

Many consumers have probably never heard of the Mail-Order Rule, but if you order PCs—or anything else—through a catalog or over the phone, you should be familiar with it. Here are the most important points:

Rule #1: Companies must ship orders within the time they specified on the

By Roberta Furger

KEEPING UP

Looking for an Energy Star–compliant computer but don't know who makes one? The Environmental Protection Agency now publishes listings of Energy Star–compliant computers, monitors, and printers on the Internet (http://www.epa.gov; look under EPA Gopher • Consumer Information).

The Center on Disabilities at California State University at Northridge runs comprehensive conferences on computer technology for the disabled. An international conference held in Los Angeles in March covered everything from software that enables blind users to browse the World Wide Web to computer training to help disabled people become more employable. An August conference in San Francisco titled "Virtual Reality and Persons With Disabilities" will focus on software tools. The center now offers updates on its activities via Gopher on the Internet (from the Gopher network, access California State University, Northridge • Center on Disabilities). Or contact 818/885-2578 or ltm@csun.edu.

phone or in their advertisements. If no time is clearly stated, orders must be shipped within 30 days. The clock starts ticking once your order is finalized (that is, once they've got your credit card number or check in hand).

Rule #2: If a company cannot meet the stated date or the 30-day delivery date, it must notify you of the delay, give you a new delivery date, *and* offer you the choice of agreeing to the delay or canceling your order. An important point: The onus is on the company to notify the buyer—it's not up to the buyer to call the company repeatedly for a revised delivery date. If you opt for the refund and paid by cash, check, or money order, companies are required to send your refund within seven days of the order being canceled; credit card buyers must have their accounts credited within one billing cycle.

What happens if a company doesn't contact you when your PC doesn't ship on time? "Contact your state attorney general's office," advises Joel Brewer, an attorney with the Federal Trade Commission in Washington, D.C. (The FTC enforces the Mail-Order Rule.) In the past, consumers have complained that state offices aren't very helpful when the complaint is about a company in another state, but Brewer says that's changing. "States are cooperating more and more with one another and with the FTC," says Brewer, so complaints are much more likely to be followed up and, if appropriate, acted upon. Brewer also suggests writing or faxing a copy of your letter to the FTC (Washington, DC 20580; fax: 202/326-3259).

But writing a letter isn't your only recourse. Follow these tips when buying your new PC, and you may never have to complain:

- Ask for a delivery date; if the salesperson won't give you a specific date, then ask for a range. The FTC uses the *latest* date when evaluating compliance with the Mail-Order Rule. So, for example, if you're told your PC will arrive in four to six weeks, the company has up to six weeks to send it.
- Ask the salesperson how you'll be contacted if the order is delayed. If the company doesn't routinely notify customers of a delay, educate your salesperson—let him or her know it's your right to be notified.
- Exercise your right to a refund if you aren't informed of delays.

Though few consumers are aware of it, the Mail-Order Rule affords you a tremendous amount of protection. Use it.

Shop Talk

Where's the Disk?

I recently purchased a Compaq 4/50 computer but didn't get the Windows, DOS, and other system disks. Thinking they'd been left out, I called Compaq. I was told that the company does not ship disks or manuals with the software packages its systems include but that I could purchase the

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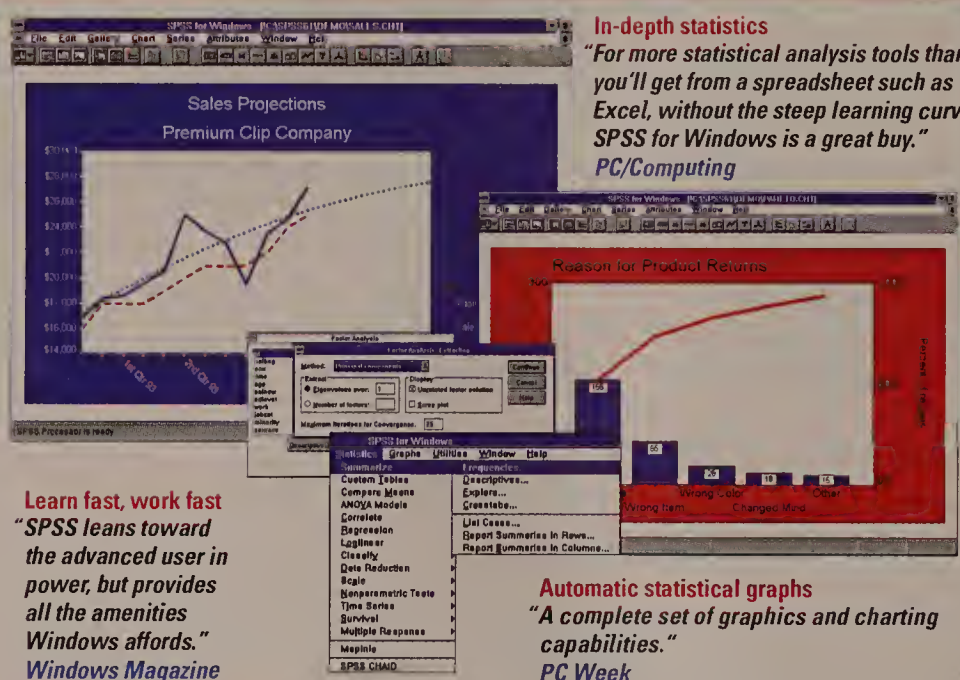

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PC/Computing

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Circle 253 on reader service card

WE'VE ALWAYS SAID OUR MONITORS ARE TRIUMPHS OF TECHNOLOGY. NOW, IT'S OFFICIAL.

The Nokia 447X has just been named a Best Buy by *PC World*. This adds to a long and growing list of awards and honors for Nokia monitors.

Ever since their introduction in the U.S., Nokia has been recognized by editors and sophisticated users alike as technologically superior. The displays are brilliant and tack-sharp. The ergonomics are an exuberant expression of Nokia's European home.

Nokia "firsts" read like a history of advanced monitor technology; including the world's first TCO and MPR II-certified emissions control and the first all digital monitors with on-screen menu controls.

As the need for quality monitors expands into more homes and businesses, the appreciation of Nokia excellence grows with it. And, as more people look into Nokias, they are finding more than technical superiority. They're finding superior value.

So if you're considering an upgrade of your monitor, be sure to consider a Nokia. Obviously, the experts already consider them the best you can buy. For more information and the name of a dealer near you, please contact us at 1.800.BY NOKIA.

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disks for an additional $35 to $40. The catalog states that Compaq includes all the disks and documentation but makes no mention of an additional charge.

I feel very strongly that this practice is deceptive.

William Gardner Knight,
Essex, Connecticut

Editor's note: It may seem like an omission, but some companies don't as a matter of course include the documentation or disks for preinstalled DOS and Windows. A spokesperson for Compaq explained that including disks and manuals with every machine would increase prices. The way it's set up now, only those who want manuals and disks have to pay for them. All the documentation for DOS and Windows is stored electronically on the computer, and the system comes with a utility to walk you through the process of backing up the programs to disk.

This policy applies only to DOS and Windows, though, not to applications you purchased preinstalled on your computer—and this is where Knight was led astray by catalog copy and industry terminology. If you buy an application such as Microsoft Office preinstalled on your Compaq, you get all the disks and manuals that normally come with the application. Company policies on including disks and manuals with software vary, so ask before you buy.

Here is a sampling of policies on DOS and Windows from a few big companies: Order an Aptiva from IBM PC Direct, and you'll automatically get DOS and Windows manuals. If you want the disks, ask for them; the company will send them at no additional cost. Gateway includes disks and manuals as a matter of course—unless you order your software on CD-ROM. In that case, all the documentation is on the CD-ROM. At Dell, you have to order disks and manuals just as you would any other component of the machine—and you do pay extra for them.

Struck by Lightning

My company has six computers, a fax machine, and a laser printer—all protected by Tripp Lite uninterruptible power supplies (UPSs). When our building was struck by lightning in July 1994, the UPSs

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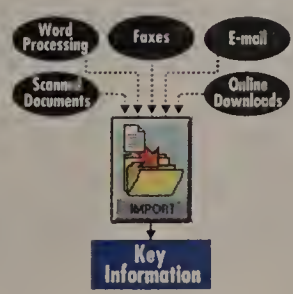

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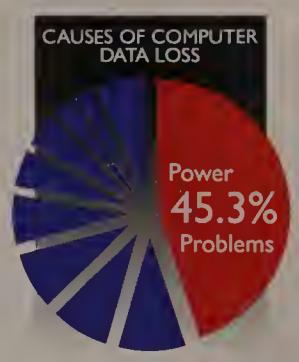
Circle 91 on reader service card

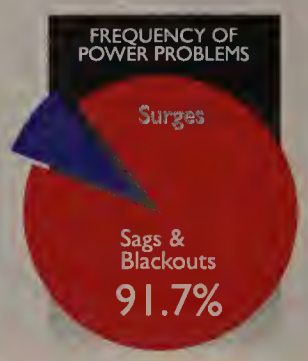
New Back-UPS®: $119 blackouts, brownouts

Just don't have the time for power problems on your PC? Don't worry. They'll always make the time for you. It's not if a power problem will occur, but when. Due to household appliances, poor wiring, bad weather or even other office equipment, power problems are as inevitable as death and taxes. You can't run, but you can hide, behind APC protection.

That's why we've just introduced new models in our award-winning Back-UPS line, now delivering reliable protection for just $119.



Source: Contingency Planning



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In the next three months, more than 30,000,000 PCs will be hit by power problems...

Who needs power protection? If you use a computer, you do. A study in a recent *PCWeek* showed that the largest single cause of data loss is bad power, accounting for almost as much data loss as all other causes combined. Every PC plugged into an outlet is vulnerable. In fact, you have better odds of winning the lottery than of escaping the sting of power problems. One study found a typical PC is hit over 100 times a month, causing keyboard lockups, hard drive damage, and worse.

Simply put, if power problems are the least of your troubles, you've got one chance to keep it that way. You insure your car and home with the best policy you can afford. It just doesn't make sense to leave your PC (which is at far greater statistical risk) vulnerable to loss or damage.

Why a $119 APC UPS costs less than a $9.99 "surge protector"...

Contrary to most people's belief, a PC alone already has more protection built into it than a low-end "surge suppressor," which is usually nothing more than a well-packaged extension cord. In other words, going without any protection is just as good as underspending on one of the most important PC decisions you'll make.

For extended brownout protection for advanced PC workstations call about APC's New Back-UPS Pro!

And since sags and blackouts represent more than 90% of power problems likely to hit your computer, even quality, high-performance surge suppressors are literally powerless to protect you from data loss.

PC World Top 20 Upgrade

"Don't take chances. Get the ultimate protection... from APC." --PCWorld

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PC MAGAZINE UK EDITORS' CHOICE

"The clear winner in price performance... it's unbeatable..." --PC Magazine UK

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protection against and other trials by fire

More than 3,000,000 satisfied customers count on APC reliability that goes above and beyond the call of duty

After a raging fire which took 18 trucks to subdue, Michael Benolkin, director of the Systems Division at Correa Enterprises, Inc. didn't expect much. "While rummaging through the ashes, we heard something beeping. Our four APC units were still in action, while two UPSes from another brand were history. We're still using these same APC units at our new office location - they still work like a charm! We're impressed with the ruggedness, reliability, and product support offered by APC."

Trial by Fire

Brian Krause, Network Manager for Goodyear Airship Operations, knows how critical APC protection can be." The night of the All-star game a tornado came through our blimp hanger and took out our roof. Our airships demand absolute communication so I protect our local and remote servers with the most reliable protection I can find: APC. APC's PowerChute software shut our server down in an orderly way... closed out all files nice and neatly. When we reconnected, everything came back up perfectly, without a hitch."

Trial by Air

Doug Welch learns his reliability lessons well: "While still a Computer Science student, I was at home preparing a large spreadsheet for a final project when Anchorage experienced an all too common 5+ Richter earthquake. If not for my Back-UPS 400 it would have been back to square one! I'm now the Network Systems Manager at Charter College, in charge of three networks. I learned my UPS lesson well back in my student days. I've never been disappointed with APC and the product has had quite a work out."

Trial by Earth

Faced with a water main break, Mark Conley, Regional Manager of Novell's remote sales office in Detroit was amazed at APC's reliability. "The APC unit was sitting in an inch and a half of water, working just fine, as though nothing was unusual and we lost no data to this disaster. We've used APC here now for at least four years - more than a dozen units are all around the office, and we're well satisfied, so we were even more impressed to learn that the units are amphibious!"

Trial by Water

Back-UPS Award Winning FEATURES

- Unmatched surge/lightning protection for maximum hardware safety
- Site diagnostics automatically spot missing ground and reversed polarity
- LAN signaling allows simple shutdown with interface kits for automatic data protection (400 and above)
- User replaceable, hot swappable batteries insure uptime safe disposal. Batteries will last 3-5 years under normal use.
- $25,000 lifetime Equipment Protection
- 10 minute runtime with specified applications. For longer runtimes choose next largest unit.

Model	Application	Sugg.List
200 **NEW**	"Green" PCs	$119
250 **NEW**	LAN Nodes	$139
400	Desktop 486/386 systems	$199
450	Tower 486/386 systems	$254
600	CAD/CAM workstations	$359
900	Longer runtime	$529
1250	Multiple systems	$689

That's why you need instantaneous battery backup power from an APC Uninterruptible Power Supply to prevent keyboard lockups, data loss, and crashes. With an APC UPS, you get six times the protection of a high-end surge protector for little more than twice the price. And $119 is much less expensive than false piece of mind. APC UPSs carry up to a $25,000 lifetime guarantee against surge damage to your properly connected equipment, and are available to suit any application, from network servers and PCs, to fax and satellite systems.

PROTECT YOURSELF OR KICK YOURSELF...

It's been said that there are two types of computer users: those who have lost data, and those who are about to. Prevent the single largest cause of computer problems and join a fast-growing third category: those who protect their PC's with the most reliable protection they can buy: APC UPSes. So ask for APC at your favorite reseller. At just $119 an APC UPS is serious protection no serious computer user should be without.

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protected most of our electronic equipment. Only one computer—a Gateway—got "smoked."

After the smoke cleared, we contacted Tripp Lite regarding its "Lifetime Ultimate Insurance Policy" and were sent a claims package. Since the policy required that we include the repair receipts with the claim, we sent the computer back to Gateway 2000 for repairs. Once it was repaired and we had receipts, we sent the documentation and the UPS in question to Tripp Lite customer service. Then we waited. After many phone calls and six weeks of waiting, someone in the claims department finally contacted us to say our claim had been denied because the UPS showed no sign of damage.

So despite our doing everything outlined in the claims forms, Tripp Lite still won't honor the warranty.

Keith Troska, Manitowoc, Wisconsin

Editor's note: We contacted Tripp Lite, which reconsidered Troska's claim. But Robert Mazalin, a spokesperson for the company, told us he supported the company's original decision not to honor the warranty (though the company did send Troska four new UPS units for his trouble.) "Those products give their life protecting the computer. If there was a power surge to the computer, there would be damage to the UPS," he explained.

Troska is certain the damage was caused by the lightning, however. "We were using the computer before the lightning struck, and afterwards it no longer worked," he says. Even the Gateway technician suspected that the damage to the motherboard, hard drive, and video card was caused by a power surge.

The fact is, though, that Tripp Lite (like most UPS companies) requires solid proof that damage to electronic equipment was caused by the failure of its product. For Tripp Lite, the only proof that counts is damage to the UPS. Troska is glad he had his electronic equipment plugged into UPSs: "We smoked only one computer. We would have smoked a lot more if we hadn't had the UPSs." Still, he's disheartened by the way Tripp Lite handled his claim, and he says that he intends to buy his next UPS from another company.

When Is a Bargain Not a Good Deal?

I ordered a Gateway computer based on an ad in *Computer Currents*, a local magazine. I'm not a naive shopper—I read the ad carefully and made what I thought was an informed decision.

But when the unit arrived, it was clear that this was not a new computer. I called Gateway, and the person I spoke with confirmed that my computer was, indeed, remanufactured and told me that this was stated clearly in the ad.

I went back and looked at the ad, and it took me several minutes to locate the words "remanufactured systems"—even though I knew what I was looking for.

The system may be just fine, but I feel like I've been had.

Joe Meyer, Oakland

Editor's note: We looked at the ad, which ran in several regional *Computer Currents*, as well as in local newspapers around the country, and we, too, had a hard time ▶

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Personal Computer World, *December 1994 (United Kingdom)*

"OS/2 Warp...brings advantages which give it a significant technical lead..."

The European, *October 14, 1994 (Europe)*

"[OS/2] Warp is the natural upgrade for OS/2 for Windows™ users as it will run the latest versions of Microsoft®'s Windows software."

The Courier Mail, *October 18, 1994 (Australia)*

"Fast, dependable, able to work better with fewer resources...a viable candidate for standard operating software for the multiplatform PCs of the future."

PC Windows, *September 1994 (Italy)*

"With Windows 95 delayed...this is IBM's window of opportunity. OS/2 has always been technologically superior..."

Kevin Linfield*, Computing Now! *December 1994 (Canada)

"IBM's OS/2 has quietly evolved from a DOS replacement to a corporate-class, scalable family of desktop and server solutions."

PC Week, *November 14, 1994 (USA)*

"...no operating system product to date has offered as much out-of-the-box value as OS/2 Warp."

InfoWorld, *November 14, 1994 (USA)*

"...it's obvious that IBM® has put a great deal of time and effort into making [OS/2] Warp a highly-optimized, easy-to-install, and easy-to-use operating system..."

Stan Miastkowski*, BYTE Magazine, *November 1994 (USA)

"The wizard of OS/2...the main feature of this new version is that it requires less memory and it provides better performance."

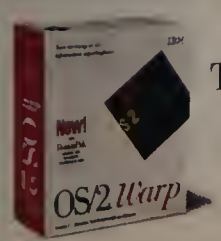
InfoCHANNEL, *October 1994 (Mexico)*

"My personal favorite–perhaps the most useful productivity software available today–is IBM's superior operating system, OS/2."

FORTUNE,® *March 6, 1995 (USA)*

"OS/2 Warp will bring your system up to speed, hitting all cylinders by putting serious power under the hood."

Home Office Computing, *February 1995 (USA)*



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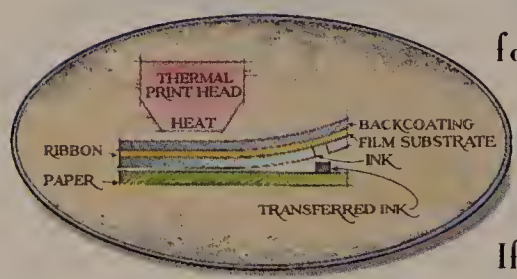

Thermal Transfer Process

If you make overheads, if you make graphic presentations, they simply make your work look clear, precise, and professional.

You see, the SuperScript Color 3000 is a thermal transfer printer. And, when it comes to color, it is far superior to an ink-jet printer. Ink-jet printers can leave you with washed-out colors. Not so with thermal transfer.

What's more, this NEC printer allows you to choose between three different modes of printing. That's because, as you know, color printing can get expensive, and there are times when you need a color print but not a deluxe photographic-quality print. The SuperScript Color 3000, unlike most printers out there, gives you a choice.

Photo Color™ mode – also known as Dye-Sublimation – gives you the ability to print incredibly sharp, vivid photographic-like color images. In short, professional-looking images that will add polish to any presentation.

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With our Graphic Color™ mode, the size of the dots on the page are controlled to give you near-photographic quality, but at less cost per page than the Photo Color mode. Finally, the Thermal

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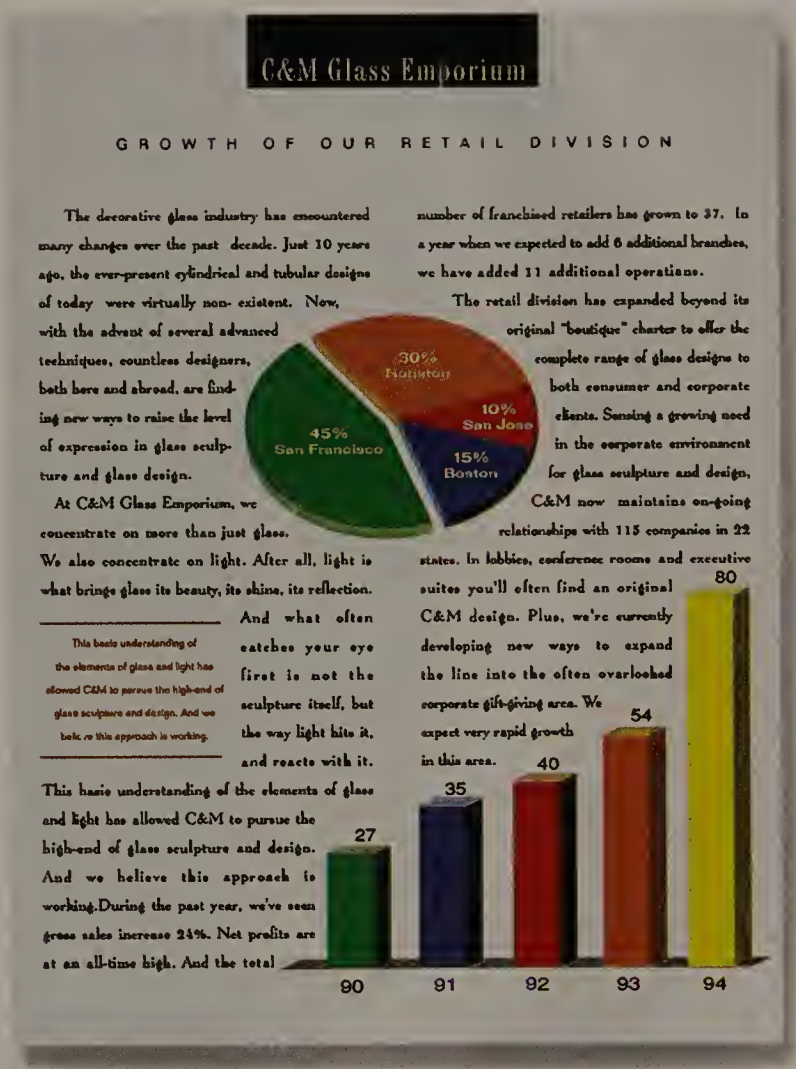

THERMAL TRANSFER MODE

Transfer mode is ideal for charts, graphs and diagrams. And you can use it to make rough color drafts, which will certainly save money over the long haul.

On the subject of saving money, the NEC SuperScript Color 3000 will cost you less than $1,000. For a color printer with three different printing modes, that price, quite simply, is just hard to beat. (We invite you to compare.)

Well, that concludes our presentation. Now it's time to close the sale. For additional information, simply call 1-800-NEC-INFO. Get details via fax by calling NEC FastFacts™ at 1-800-366-0476. Request document #7723000 for Windows or #7723006 for Macintosh.

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Circle 202 on reader service card

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who is very particular

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The Lion King

Bug: When Disney's Animated Storybook: The Lion King CD-ROM shipped just before Christmas, parents flooded online services and customer service lines with complaints. The reported problems include errors during installation; incompatibilities with all 8-bit and a few 16-bit sound boards, as well as with some video boards; and video playback errors. Disney Interactive hasn't admitted the product has bugs but says the original version is incompatible with some older hardware.

Fix: Check the system requirements on the bottom of the package—The Lion King 1.0 won't run on every multimedia PC. It requires at least a 486SX-25 with 4MB of RAM, DOS 6.0 or later, Windows 3.1 or later running in Enhanced mode with a permanent swapfile, a 16-bit sound board, and a double-speed CD-ROM drive. If you have an 8-bit sound board, call Disney Interactive customer support and request a free version 1.1 CD, which incorporates support for 8-bit sound boards. Version 1.1 also fixes incompatibilities with the Cardinal DSP 16 and Orchid Gamewave 32 16-bit boards.

If you're not sure which version of the Lion King you have, check the system requirements printed on the bottom of the box—if it mentions both 8-bit and 16-bit sound boards, you have version 1.1. Or read the serial number etched on the inner ring of the disc's underside: If it ends with RE1, it's version 1.1. For a complete guide to troubleshooting errors with the Lion King CD, download Disney's FAQ (frequently asked questions) file, lkasbfaq.wri, from the company's BBS, or from forums on CompuServe (go gamepub—the file is named kasbfaq.txt here) and AOL (keyword disneysoft). Disney Interactive Customer Support, 818/544-4300; Disney Software BBS, 818/567-4027.

Bug Watch Bugs

Based on information provided by Western Digital, we reported in our February issue that the company would make version 2.6 of its 32-bit driver available on CompuServe and AOL forums (go wdc and keyword wdc, respectively). Unfortunately, the forums were not up and running by the time our February issue hit the streets. A Western Digital spokesperson promised the forums would be functioning by the time you read this.

—Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest. Due to the volume of queries, we may not be able to return your call, and we can't provide technical support.

locating the statement saying that the advertised PCs aren't brand-new units. So we called Gateway for a comment. "It's not in neon lights, but we aren't trying to hide the fact that these computers are remanufactured," said Gateway 2000 spokesperson Wendell Watson. He also pointed out that the advertised remanufactured PCs came with just a one-year parts-and-service warranty, as opposed to the standard three-year limited parts warranty that comes with Gateway's new systems.

Remanufactured computers are not necessarily a bad thing. These PCs have been returned by customers and tested by Gateway; they work fine but can't be sold as new. And they are great bargains. A Pentium-60 with 8MB of RAM was listed at only $1199 in this ad. The fact that these remanufactured PCs are sold at bargain prices could be a selling point for Gateway. But a bargain becomes a disappointment if you end up feeling deceived.

Shop Talk *is written and researched by* PC World *associate editor Christina Wood, with research assistance from Peggy Nauts. Think you've gotten a raw deal—or a great one?* Consumer Watch *wants to hear the details. We'll investigate complaints and publish letters with the broadest interest. See page 12 for contact information.*

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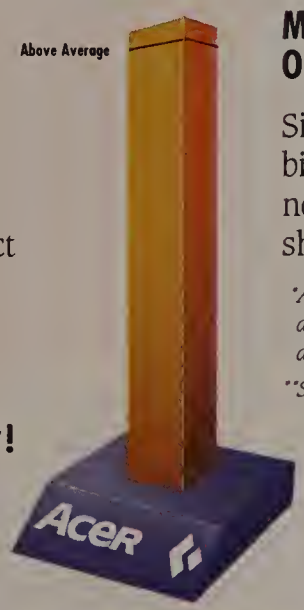

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It's All in the Process

Next to *downsizing, reengineering* is the premier buzzword of the nineties. Increasingly thought to be the key to survival in a dog-eat-dog world, reengineering is what companies are doing in order to speed up delivery, cut red tape, and eliminate errors. Reengineering concepts such as total quality management are staples of the factory floor. But can these approaches work for a service company, where it's tougher to measure error or defect rates? Absolutely, says Edward Chaplin, a neurologist and medical director of Continental Rehabilitation Hospital in San Diego. Chaplin describes how he and his colleagues used a Windows-based business process analysis tool to redesign the hospital's delivery of an important service. —*Ed.*

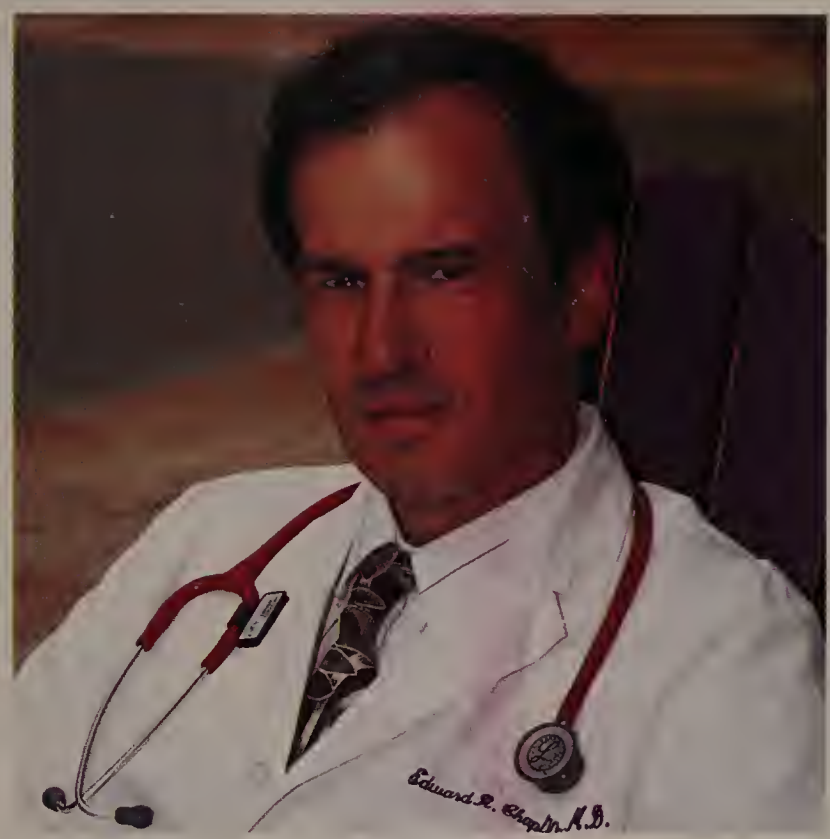
Rehabilitating the Rehabilitators

Like everyone else, health care professionals worry about controlling costs. Ours is a $900 billion industry, and a lot of that money is spent compiling reports, filling out forms, and negotiating with insurance companies. Managing the bureaucracy demands almost as much time as caring for patients.

I'm a neurologist in a 110-bed rehabilitation hospital that helps people overcome or adapt to severe injuries or chronic diseases. I treat patients as individuals. But my organization must also satisfy other customers, such as the insurance companies.

Comprehensive medical and legal evaluations for insurance companies can drain time, money, and effort. Each new patient undergoes an evaluation involving as many as 15 tests and up to 30 physicians, physical therapists, nurses, administrators, and others.

Our problem was to coordinate all the tests, complete them, and compile a medical and legal document summarizing findings and recommendations. It's rather like getting 30 people to write a novel together. In the past, new patient reports were done in a linear fashion. One doctor performed the evaluation, ordered tests, received results, compiled a report, and sent the form to an administrator, who scheduled the next appointment with another doctor, who followed the same process. It took as long as three months to complete the evaluation and then generate a report for the insurance company.



JAMES ARONOVSKY

This method of working had two negative effects: Patients didn't get resolution of their problems quickly enough, and insurance companies had to pay more money for all the time patients spent in evaluations.

Customers and Performers

Several years ago, I read a book called *Computers and Cognition* by Fernando Flores and Terry Winograd. Their book discusses how office workers continuously negotiate with each other, juggle priorities, and try to fulfill commitments. As I read the book, I began to think about how the way we were operating resulted in wasteful, inefficient work habits.

Flores and Winograd's prescription first called for understanding our business process. If we could map out our own processes, I thought, we could find out why it took so much time to complete evaluations and reports.

In August of 1994, we purchased a $495 program Flores and Winograd helped write, called ActionWorkflow Analyst from Action Technologies. The software assumes that organizations are networks of interactions in which everyone is a "customer" or a "performer," all sharing a common goal: customer satisfaction.

Edward Chaplin, medical director of Continental Rehabilitation Hospital, San Diego.

In our case, the goal was clear: to shorten the time it took to complete a new patient evaluation and submit it to the insurance company. We set three weeks as our target. It took me only a day to get started on the software. Far more difficult was figuring out what steps went into conducting an evaluation and compiling a report. I had no idea how other people in the loop worked. So we set up a Process Action Team to map out the process.

With our group assembled, we used the software to identify four phases. The first phase was the Preparation, where we looked at what offers we could make and what promises we could commit to. The second phase was the Negotiation—working out the

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time and conditions of a treatment program with the insurer and members of the evaluation team. In the third phase, Performance, we did the evaluations and tests and generated a record of results. The fourth phase was Acceptance, making sure the insurance company was satisfied.

The software helped us break each of these four phases into steps. Ultimately, we produced a work flow analysis diagram that illustrated all the inefficiencies in our way of working. We saw that we needed to shuffle tasks and consolidate steps. For example, instead of waiting for the results of one evaluation before proceeding to the next—a process that could take several days—different specialists could perform evaluations in one day. We also saw that we needed a monitor to hold the doctors, nurses, and other players to their commitments.

Within two months, we had shortened the time it took to send a final report to the insurance companies from two or three months to three or four weeks, and our reports were clearer and more thorough. The effect on our personnel has been equally dramatic. The clerk-monitor empowered with managing our doctors has a new career opportunity, and we've been able to save the time of highly paid professionals. Compiling and editing a report used to take up to 8 hours; now I can do it in 1, because I don't have to wait for someone else to chase down information.

With the success of our small reengineering project, we're moving on to bigger ideas. Because the ActionWorkflow Analyst works with large databases (including Lotus Notes), we hope eventually to get all our hospital processes streamlined.

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Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 12 for contact information.*

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[?]

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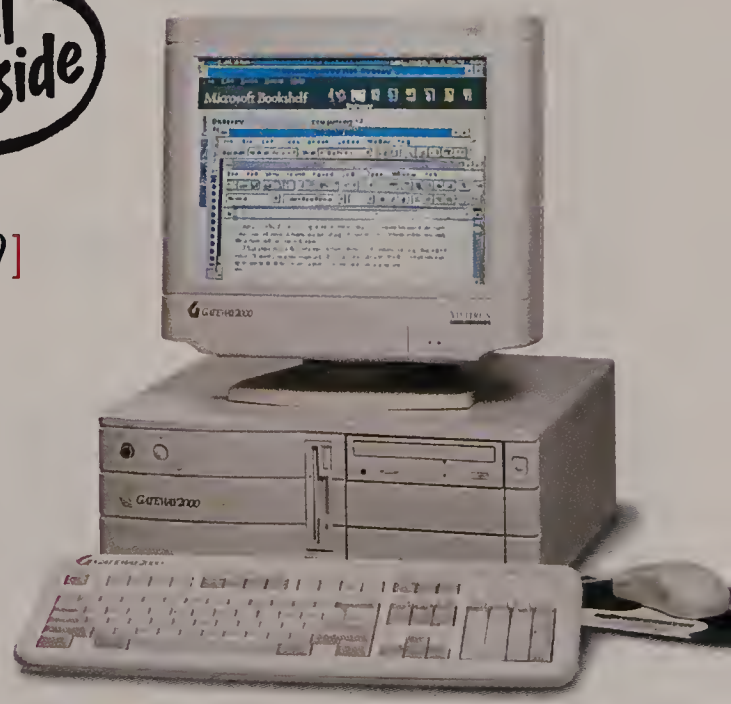

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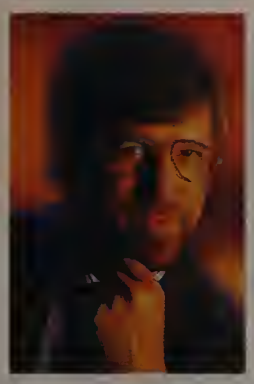

I am waiting in line at the post office behind somebody who's trying to fathom the mysteries of Priority Mail. The Postal Service promotes it as a cheaper alternative to FedEx and other guaranteed two-day services.

"So is Priority Mail guaranteed to arrive by the second business day?" asks the suspicious customer.

"It's not guaranteed," the clerk retorts. "It's a service standard." English translation: We'll try to get it there in two days, but tough noogies if we don't.

E-mail, it turns out, often works pretty much the same way, but hardly anybody realizes it—until too late. Users have come to expect that when they click the "send" button, their E-mail will be delivered in, oh, a second or two. And within a given company, internal E-mail usually does whiz around reliably and on time (though I've heard of some alarming exceptions).

The problems come when mail confronts the cruel outside world. Many networks can't afford to be connected to the rest of the universe all the time, so they hook up at intervals—every 15 minutes, every hour, or even as rarely as once a day. For users, this arrangement can be like the daily FedEx pickup—miss it today, and your mail won't go out until tomorrow. At least with FedEx, you know what's going on.

That's not the only complication. You may tell your software to send a piece of urgent mail via fax, but the network administrator may have told the network to hold faxes until the wee hours when rates are low. Even in companies that make special efforts to guarantee quick internal E-mail to the other side of the world, it can be a different story when it comes to destinations outside the company. If you don't know the rules (and I'll bet you don't), you have no way of knowing how long a message sits around before it leaves the system or how long you can expect to wait before an inbound message reaches you. If it's a business communication that absolutely, positively has to be there right now, you may be absolutely, positively out of luck.

This kind of predicament is not confined to corporate networks. You might, for example, think that because of the sheer volume of mail they handle, commercial services like America Online and MCI Mail would get the stuff in and out their doors virtually instantaneously. Alas, you would be wrong. The last time I sent a column to my editors, it apparently sat in MCI Mail's system for hours before it hit the Net.

In a recent experiment, I sent a message from each of my four online accounts via the Internet to each of the other three. The Net itself, in this test, at least, was blameless: According to the headings the Internet appends to E-mail, once the messages hit the Net, they were delivered in fewer than 5 minutes. CompuServe, MCI Mail, and Netcom also worked fine. But after receiving the messages, America Online kept them for more than a day and half before posting them to my mailbox. AOL admits it's working on the problem.

The weirdness continues. Send a message to a nonexistent address on the Net, and you'll get some sort of "addressee unknown" message from something called bounce-mail—except when you don't. Send a message with an attached file, and all bets are off. It's like standard postal mail: You can never be sure that your message was received.

You can, of course, request a return receipt, but it will be less reliable than the ones you get via the Postal Service. Receipts generally work well within a particular system, such as MCI Mail or CompuServe, but a receipt transmitted via the Net generally means only that the message was accepted by the recipient's electronic post office; whether your intended correspondent opened it or even received it remain unclear. Even if the receipt is marked "read," the message may simply have been picked up by "agent" software and deposited in some sort of local in-box.

As one insider told me, "The analogy in the E-mail industry is the Postal Service." He went on to point out that users expect E-mail to be like the phone—and it's not. A global directory of E-mail addresses would help, though firms that remain protective of their internal phone directories would not be happy with that idea. We could also use some security, but that's a subject for a book, not a column.

If there's a business communication that absolutely, positively has to be there now, you may be absolutely, positively out of luck.

Let's push for full disclosure of service standards. And let's demand swift, reliable delivery of every "package" imaginable (even snail mail gives you one out of two).

By Stephen Manes

PC World *contributing editor Stephen Manes is a columnist for* The New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon and Schuster, New York, 1994).*

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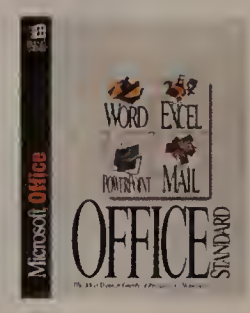

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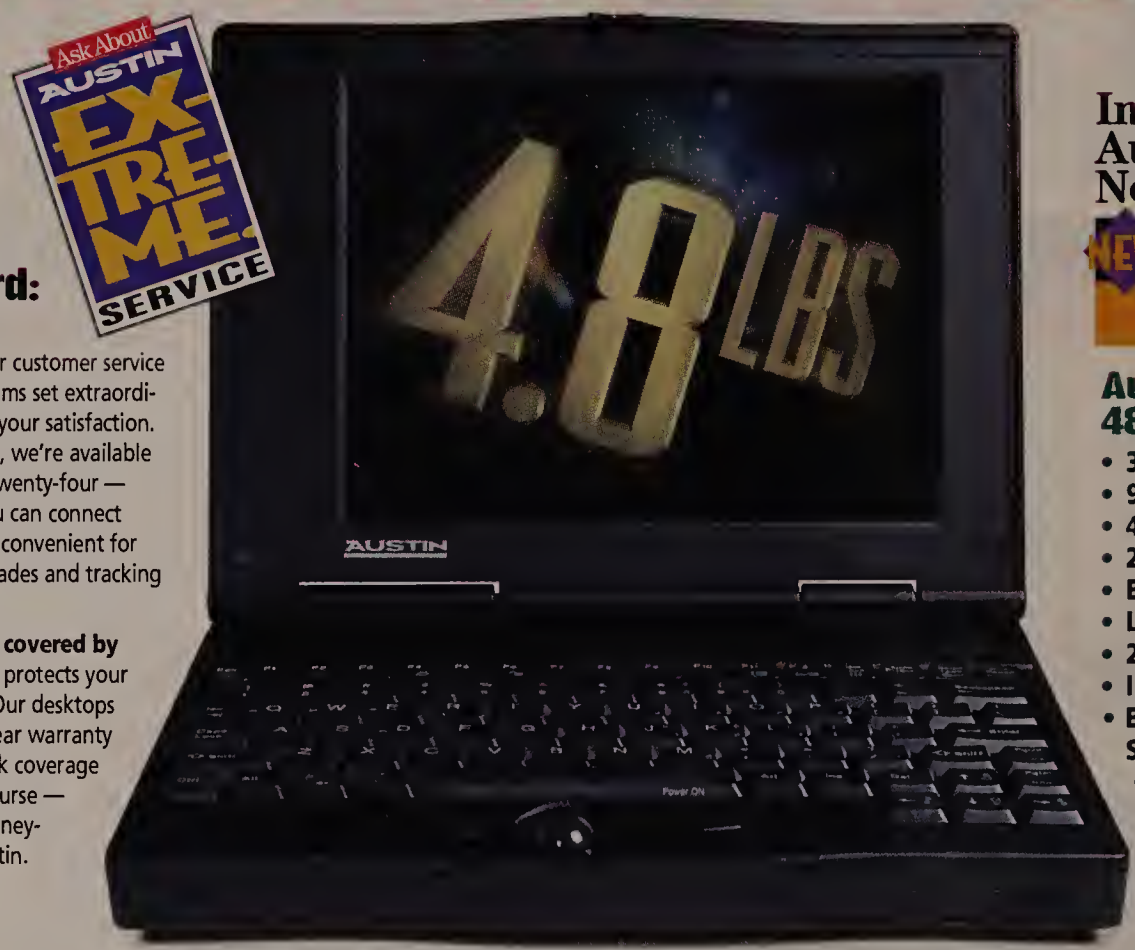

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Circle 22 on reader service card

NEW HIGHS:

PENTIUMS SPEED TO 120 MHz

We pound on early systems from five top vendors. While these are the fastest PCs we've seen, their more affordable (but slower) 100-MHz siblings could be your best choice—for now.

Edited by Randy Ross

TEST DRIVE ▶ If there's one unquestioned axiom in the microprocessor industry, it's this: Faster is better. Today's processor-pounding applications such as video conferencing, multimedia presentations, and graphics-laden entertainment titles demand more speed from a CPU than ever before.

To keep up with that demand, there's a new high end in desktop processors. Intel's 120-MHz Pentium processor is now available in a variety of desktop PCs, at prices starting around $3700. We tested preproduction units from Dell, Gateway 2000, Hewlett-Packard, Micron, and Zeos, with results all over the map: Two systems were more than 30 percent faster than the average P-100, while one was 8 percent slower.

The P-120 processor adds about $400 to $500 to the price end users pay for a PC, compared to what they'd pay for an identically equipped P-100 system, While some could use the extra juice to run sophisticated CAD, desktop publishing, and database applications, price-conscious buyers might consider the slightly less powerful P-100—at least until Intel lowers the P-120's price. This should happen later this year when a combination of market forces takes hold, including events such as Intel's planned rollout of its 150-MHz Pentium and 133-MHz P6 processors; improved manufacturing yields on the P-120; and the introduction of new Pentium-class competitors (see "Competition at the High End").

Fastest Pentium—For Now

The 120-MHz chip is the latest advance in the evolution of Intel's Pentium franchise. It's pin-compatible with other 3.3-volt Pentiums, including 75-, 90-, and 100-MHz versions. Since the new chip requires few revisions to the motherboard, it's easier for PC manufacturers to quickly introduce 120-MHz PCs.

The P-120 features the clock-multiplier technology used in many 486 and Pentium processors. While the P-120 processes instructions internally at 120 MHz, it uses a Pentium motherboard running at 60 MHz (as do 60- and 90-MHz Pentiums). By comparison, the 100-MHz Pentium uses a faster 66-MHz system bus—a factor that lessens the P-120's clock speed advantage. Intel says systems with the P-120 chip will be upgradable to future, higher-performance Pentium processors.

Attack of the 120s

Of the five preproduction 120-MHz systems we tested, two emerged as the speed champs: Gateway's P5-120 and Micron's P120 Millennia. Both zipped through our Windows benchmarks with nearly identical test scores and were 30 to 45 percent faster than competing P-120s from HP and Zeos. It's worth noting that the Gateway and Micron P-120s (and runner-up Dell) used the new Extended Data Out (EDO) memory and Intel's new Triton PCI chip set. EDO is a new breed of high-speed RAM that does a better job than conventional DRAM of keeping up with today's high-speed processors, thus reducing the number of *wait states*—the time the CPU sits idle waiting for instructions from memory. (For more information on EDO memory, see the March *Top of the News*, "Micron's Millennia Proves to Be Fastest PC.") You can expect EDO memory to become standard on high-end Pentium PCs. The Triton chip set improves the performance of Pentium systems by allowing faster communications from the CPU to RAM as well as to IDE and PCI peripherals.

Although Gateway's P5-120 tied for first in the speed sweepstakes, it is one of the pricier systems that we tested. The P5-120 also has the best configuration of the lot. Priced at $4299, the P5-120 includes 16MB of RAM, a roomy 1.6-gigabyte hard drive, an ATI Mach64 PCI graphics accelerator with 2MB of VRAM, and a 17-inch monitor. In addition, the system's quadruple-speed CD-ROM drive can hold three discs, saving you from having to swap discs repeatedly. Finally, the system includes an Ensoniq 16-bit sound board as well as a Telepath 28.8-kbps internal

Breaking News

MICROSOFT ANTITRUST WRANGLE CONTINUES: In separate appeals, Microsoft and the Department of Justice argue that U.S. District Judge Stanley Sporkin exceeded his authority in February when he rejected the proposed settlement of Justice's antitrust case against Microsoft. Both parties have asked the Court of Appeals to send the matter back to the lower court with instructions to approve the agreement. Many industry observers believe that the settlement—which covered Microsoft's DOS and Windows licensing contracts with PC companies, as well as its nondisclosure agreements with other software firms—was too narrow in scope and let Microsoft off easy. Judge Sporkin's decision echoed those concerns. Oral arguments in the Court of Appeals are scheduled for April 24.

AST GETS SECOND WIND: Korean electronics giant Samsung is buying a 40 percent stake in AST, the PC vendor based in Irvine, California. The deal provides the financially troubled AST with a fresh influx of capital and a reliable source for PC components such as memory chips and monitors. The deal will be voted on by AST stockholders in a May meeting.

WIRELESS WALL STREET: Mobile investors can monitor their financial well-being more easily with RadioMail's new RadioQuotes wireless in-

(continued on page 67)

PHOTO: ROBERT CARDIN; ILLUSTRATION: JEFFREY PELO

modem for high-speed communications.

A more affordable alternative is Micron's P120 Millennia. For $3799, you get 16MB of RAM, a 1.2GB hard drive, a Diamond Stealth 64 PCI graphics accelerator with 2MB of VRAM, and a 15-inch monitor. Additional goodies include a quad-speed CD-ROM drive, a Creative Labs' Sound Blaster 16 sound board, and Koss HD/5m stereo speakers.

Dell's $4689 Dimension XPS P120c will ship with 16MB of EDO RAM, a 1.6GB hard drive, a Number Nine 128-bit graphics board with 4MB of VRAM, and a 17-inch color monitor. You also get a quad-speed CD-ROM drive and a 16-bit sound card. The Dimension XPS P120c ran our benchmarks roughly 10 percent slower than the Gateway and Micron P-120s.

Rounding out our test drive of preproduction P-120s are Hewlett-Packard's Vectra VL/3 5/120 and Zeos's Pantera 120. The Vectra VL/3 5/120 features 16MB of RAM, an 840MB hard drive, a double-speed CD-ROM drive, and a 17-inch monitor for an estimated street price of $4200. The Pantera 120 comes with 16MB of RAM, a 1GB hard drive, a 15-inch monitor, and a quad-speed CD-ROM drive for $3695. The relative performance of both the HP and the Zeos was subpar in our tests, perhaps due to their older PCI chip sets, use of standard DRAM rather than EDO RAM, and the fact that these preproduction systems hadn't been properly optimized in time for this preview. The HP P-120's performance was comparable to that of the P-100s we tested, while the Zeos P-120's was almost 8-percent slower.

TEST REPORT

Pentium-120s: Gateway and Micron Take Top Honors

System	CPU	Windows application test times
Gateway P5-120	Pentium-120	:59 :23 :49 :40
Micron P120 Millennia	Pentium-120	1:00 :24 :47 :39
Dell P-120	Pentium-120	1:00 :25 :52 :51
HP Vectra VL/3 5/120	Pentium-120	1:10 :32 1:04 :57
Zeos Pantera	Pentium-120	1:26 :44 :59 :55
Average of Pentium-120 systems	Pentium-120	1:07 :30 :54 :49
Average of 11 Pentium-100 systems	Pentium-100	1:10 :35 1:00 1:00

Time in minutes 0 1 2 3 4 5

Word 2.0 | Excel 4.0 | Freelance 1.0 | Paradox 1.0

All systems tested with 16MB RAM and 256K secondary cache. Results based on tests using PC World Test Center application benchmarks.

Best Bet for Business Buyers

Since PCs with the P-120 processor cost a few hundred dollars more than those powered by P-100s, business users have a compelling reason to opt for the slightly less powerful P-100. For instance, Micron says its 120-MHz Pentium PC costs $500 more than an identically equipped 100-MHz Pentium, and Zeos states that its 120-MHz costs $400 more than an identical 100-MHz. That's a stiff premium for the P-120, unless your applications demand the fastest PC around. For mainstream users, the 100-MHz Pentium could offer the best price/performance combo. But the verdict's still out until we test shipping versions.

Also, things change rapidly in the CPU world. For example, the price of the 100-MHz Pentium chip has dropped dramatically in recent months—from $917 in

Competition at the High End

While the 486-compatibles market is glutted with processors from Intel competitors, the Pentium market has remained Intel's. That's about to change. The second half of 1995 will bring new Pentium-class processors from AMD and Cyrix, plus a more powerful version of NexGen's Nx586. At the same time, Intel will counter with new chips of its own. And so it goes.

More Chips Mean...

Here's when systems sporting these new CPUs are expected to ship this year.

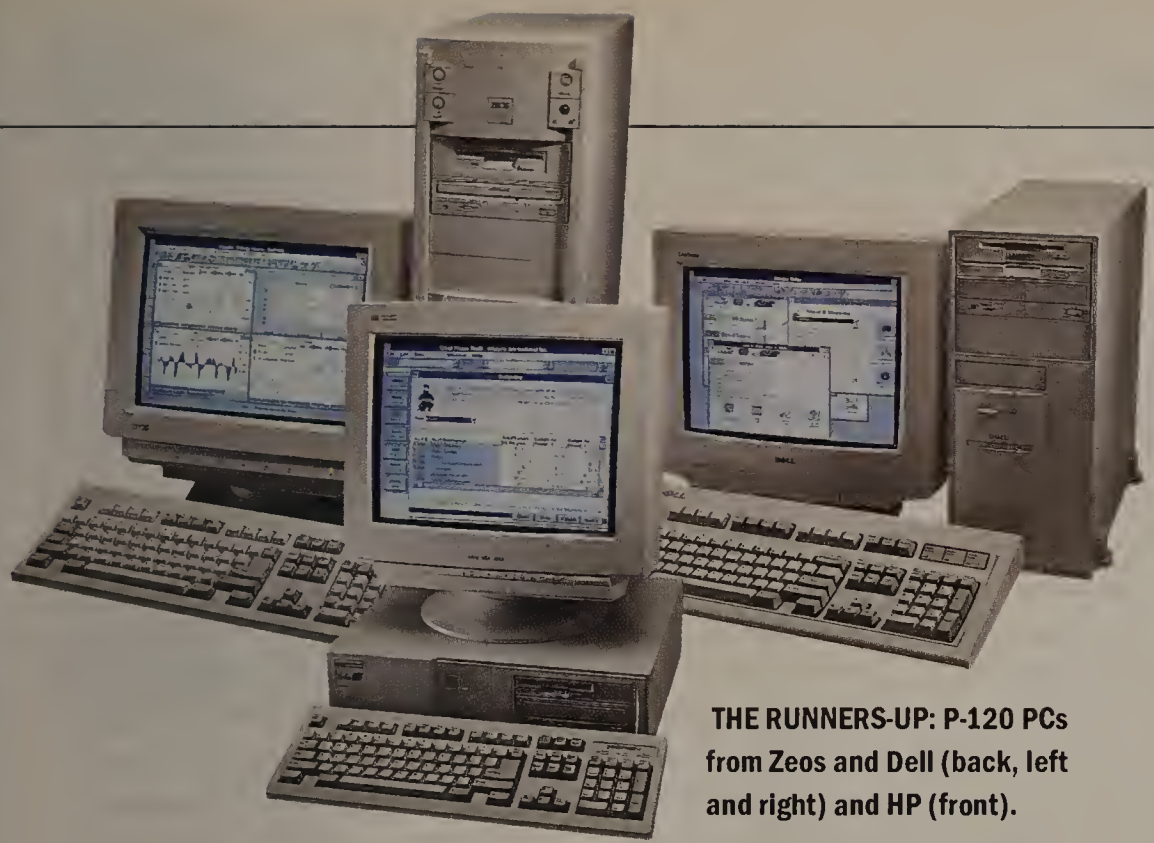
March
Intel 120-MHz Pentium
April/May
NexGen Nx586-P120
August
Cyrix 100-MHz M1
Fourth quarter
AMD 100-MHz K5
Intel 150-MHz Pentium
Intel 133-MHz P6

...More for Your Money

As system prices drop in the coming months, the same budget should net you more and more processing power. Holding off on PC purchases for six months could mean the difference between old DX4 technology and a new Pentium.

Budget	Second quarter 1995	Fourth quarter 1995
$3000	100-MHz Pentium	120-MHz Pentium
$2500	90-MHz Pentium	100-MHz Pentium
$2000	60-MHz Pentium	90-MHz Pentium
$1500	100-MHz DX4	75-MHz Pentium
$1000	66-MHz DX2	100-MHz DX4

Source: BIS Strategic Decisions



THE RUNNERS-UP: P-120 PCs from Zeos and Dell (back, left and right) and HP (front).

November 1994 to $673 in March 1995. "Intel is making room in its pricing structure for the 120, but it's also getting better yields on its 100-MHz part," says Linley Gwennap, senior editor of *Microprocessor Report*. "It's really driving the prices down."

Pentium for the Desktop

The 120-MHz chip is not the end of the line for Pentium. Intel plans to release a 150-MHz Pentium later this year but is mum on further details. "We don't expect to see higher clock speeds [beyond 150 MHz], but we'll see multiple variations of the Pentium, similar to what Intel has done with the 486," says Gwennap.

Meanwhile, Intel is busy working on its next-generation P6 chip, the successor to the Pentium. Slated for release later this year, the 133-MHz P-6 will have twice the processing power of the 100-MHz Pentium and initially will appear in high-end servers and workstations, Intel says.

So for today's PC buyer, the 120-MHz and 100-MHz Pentiums represent the top of the line. If you absolutely need the fastest system available and you need it now, a 120-MHz system is your ticket. (All systems previewed here should be available by the time you read this.) If your budget is tight, either opt for a 100-MHz Pentium system, or wait a few months and remember another unquestioned axiom in the microprocessor industry: Prices go in only one direction—down.

—Jeff Bertolucci

Dell Dimension XPS P120c

Key Features: 16MB RAM • 1.6GB hard drive • Quad-speed CD-ROM drive • Sound Blaster 16 board • **Pricing:** $4689
Dell Computer, 800/613-3355
Reader service no. 789

Gateway 2000 P5-120

Key Features: 16MB RAM • 1.6GB hard drive • Three-disc CD-ROM drive • Ensoniq sound board • Modem • **Pricing:** $4299
Gateway 2000, 800/846-2065
Reader service no. 790

HP Vectra VL/3 5/120

Key Features: 16MB RAM • 840MB hard drive • Double-speed CD-ROM drive • **Street price:** $4200
Hewlett-Packard, 800/322-4772
Reader service no. 791

Micron P120 Millennia

Key Features: 16MB RAM • 1.2GB hard drive • Quad-speed CD-ROM drive • Sound Blaster 16 board • **Pricing:** $3799
Micron Computer, 800/223-6571
Reader service no. 792

Zeos Pantera 120

Key Features: 16MB RAM • 1GB hard drive • Quad-speed CD-ROM drive • **Pricing:** $3695
Zeos Int'l, 800/554-5220
Reader service no. 793

Breaking News

(continued from page 65)

vestment service. The service tracks the prices of stocks, mutual funds, futures, and commodities. Since RadioQuotes is wireless, you can check on your portfolio even when you're away from a phone jack. As long as your modem-equipped notebook or PDA is turned on, RadioQuotes can alert you to key events, such as an investment hitting your preselected high or low price. The service also automatically sends you a daily portfolio summary. RadioMail, which provides E-mail, paging, and news, starts at about $39 per month; add $9.95 per month for RadioQuotes. Both of the services require a radio modem, such as Ericsson's Mobidem.

BAD TIMES FOR CD-ROM SOFTWARE: According to Gistics, a California consulting firm, 96 percent of the more than 900 multimedia software developers it surveyed last year lost money in the consumer CD-ROM business. Why? While the music industry uses radio, MTV, and live concerts to give consumers a taste of its audio-CD product, there's no similar preview mechanism for CD-ROM buyers, says Gistics director Michael Moon. And unlike popular video arcade games, such as Sonic the Hedgehog, that boast a large base of loyal users, most CD-ROM titles have no ready, built-up demand. Then there's the bigger issue: CD-ROM titles are tricky to install, so many buyers return them.

(continued on page 69)

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: JEFFREY PELO

Feds Target the Internet

The Republican-controlled 104th Congress is moving swiftly to improve the business environment in which the Internet operates. But certain bills, particularly those seeking to legislate morality, could stop the information revolution dead in its tracks, making even casual business users potentially liable on criminal charges.

Like its predecessor, this Congress plans to fuel the already explosive growth of the Internet and other interactive information technologies by deregulating the telephone, utility, cable, newspaper, and other media industries, allowing them to compete on products and services. Consumers should see prices for communications services drop, while technologies such as video conferencing become more available.

The main congressional vehicle for this deregulation is the Antitrust and Communications Reform Act of 1995 (House Bill 411). With it, the GOP has thus far managed to sidestep the special interests that killed last year's attempt at regulatory reform. Lawmakers were scheduled to begin acting on the legislation in late March.

This year's reform legislation would swiftly deregulate every market except local phone service. There, the regional Bells would have to demonstrate that competition existed in the local phone market.

Bad Business

Other bills, however, threaten the well-being of the Internet and anyone who uses it. The new Congress is making a concerted attempt to improve the morals of the Internet, which has long guarded a dark secret: The exchange of erotic—sometimes violently pornographic (and hence illegal)—stories, images, and movies is one of the most popular uses of the service.

But the solutions may be worse than the problem. The Communications Decency Act of 1995 (Senate Bill 314, House Bill 1004) seeks to eliminate obscene materials on the Internet and other communications networks, including the telephone and cable networks.

A second bill, the Electronic Anti-Stalking Act of 1995 (House Bill 112) targets "harassing communications" such as stories depicting

Internet Legislation: The Good, the Bad, and the Ugly

Key legislation in the 104th Congress that will affect the information highway and anyone connected to it.

The Good

House Bill 187: Amendment to the Communications Act of 1934
Goal: Lower barriers for small businesses, minority-owned companies, and nonprofit groups seeking to provide information services
Status: Introduced in the House, passage uncertain
Likely impact: Promote diversity of ownership in new media.

House Bill 411: Antitrust and Communications Reform Act of 1995
Goal: Supersede the judgement that broke up AT&T
Status: Introduced in the House, passage likely
Likely impact: Powerful consumer bill. Grants freedoms to regional Bells. Includes provisions for universal access and lowers barriers preventing media concerns from entering one another's markets.

The Bad

House Bill 666: Exclusionary Reform Act of 1995
Goal: Repeal Fourth Amendment provision requiring court supervision of search warrants used by officials
Status: Passed the House, expected to pass the Senate
Likely impact: Gut Fourth Amendment protection against unreasonable search and seizure.

The Ugly

Senate Bill 314, House Bill 1004: Communications Decency Act of 1995
Goal: Eliminate obscene materials on the Internet, online services, and other communications networks
Status: Introduced in the Senate, passage likely
Likely impact: Could make those who use or provide any communications service for "obscene" purposes liable to a $100,000 fine and two years in federal prison.

House Bill 112: Electronic Anti-Stalking Act of 1995
Goal: Prevent harassment by computer or other electronic device
Status: Introduced in the House, passage likely
Likely impact: Along with House Bill 1004, could make those who use and maintain online services such as CompuServe and the Internet liable for any "harassing" or "threatening" communications and subject to the same fine and prison time. The bills could also bring development of the Information highway to a standstill.

GORDON STUDER

New laws could force users off the Internet, says the Internet Society's Tony Rutkowksi.

acts of violence against women. Violators of either law would face severe penalties: fines of up to $100,000 and imprisonment for up to two years.

If passed, these bills could severely hurt business users of the Internet. Every business with a full-time Internet connection, and every telecommunications access provider—including online services like CompuServe—would have to enforce these laws or be held liable.

Providers fear the worst. Karl Lehenbauer, director of technical operations for Neosoft Communications, an Internet service provider in Houston, says, "Should we inadvertently allow something offensive to pass, we would face penalties of hundreds of thousands of dollars and two years in prison *per message*."

In addition, the laws hold business users of the Net to an unusually harsh standard. Under the bills, if an employee sends offensive material over his or her employer's Internet connection, the employer is liable.

"The most serious problem is that it would have a chilling effect on the information infrastructure," says Tony Rutkowski, executive director of the Internet Society, a voluntary governance organization. In the face of criminal liability or regulatory burdens, many businesses might turn their Internet connections off, he says.

Sen. Jim Exon, D-Neb., sponsor of the Communications Decency Act of 1995, tells *PC World* his aim is not to stifle business or the Internet but to keep the technology safe for women and children. "I want to keep the information highway from resembling a red-light district," he explains.

Another bill would provide more tools for enforcing these laws. The Exclusionary Reform Act of 1995 would weaken protections against unreasonable search and seizure by requiring law enforcement to show only good intent, instead of a court order, before searching a business or residence.

Good Guys

If Congress holds off until June, the Internet Society, with 10,000 members worldwide, will have completed an Internet Code of Conduct that has been under development since June 1994. This code will address the issues of network intrusions, telefraud, and privacy, in addition to pornography. Indeed, the most convenient way to deal with pornography is through existing copyright law, since most of the materials are illegal scans from men's magazines.

Whether the Internet Society can forestall congressional action is anyone's guess. More important is the reaction of the Internet community. By making its voice heard, this group can help determine whether the Republican revolution uses its power to build the info highway of the future or to legislate the morality of the past.

—Joe Abernathy

Sen. Jim Exon wants to keep the info highway from resembling a "red-light district."

Breaking News

(continued from page 67)

TRACK THAT PACKAGE: The next time you need to track a Federal Express package, try this: http://www.fedex.com. That's the address of the company's site on the Internet's World Wide Web. Based on the package's tracking number, you can get a visual record of just where the outgoing or incoming item is, along with the city (but not company) of origin. This isn't a killer app, but it should save you some time.

NERDS PHONE HOME: VocalTec's Internet Phone, a new shareware application that you can run atop an interactive (TCP/IP-based) Internet connection, lets you make "free" interstate or international phone calls over the Internet—with some limitations. The sound quality is like that of a ham radio. It's single duplex, like those old-time speakerphones, so only one person can talk at a time. You can talk only to people who are on the Internet, and you must hang out on Internet Relay Chat to find their phone numbers. Hanging out on IRC is something only a hacker or a Secret Service agent could enjoy. Still, Internet Phone works. With an optional $349 data compression board, it works reasonably well. The product lists for $99 Get your copy from Info@vocaltec.com; on the Web, http://www.vocaltec.com; or phone 201/768-9400.

Edited by Randy Ross
Contributors: Joe Abernathy, Jeff Bertolucci, Roberta Furger, and Laurianne McLaughlin

PHOTOS: ABOVE, MANUELLO PAGANELLI; RIGHT, RICHARD A. BLOOM/SABA; ILLUSTRATION: JEFFREY PELO

Buyer Beware: Inflated Claims, Unmet Promises

If you're in the market for a new monitor, sound board, or PC speaker system, beware. These peripherals often fail to deliver on the promises printed on the box. *PC World* took a critical look at popular monitors and PC audio components and found a consistent pattern of misleading specifications and inflated claims.

It Gets Worse

These peripherals are selling at consumer electronics outlets alongside TV sets and stereo equipment—products that consistently meet or exceed rated performance, according to our independent tests. Whether it's sound board makers boldly promising CD-quality audio, or monitor vendors failing to stress the actual viewable area of their displays, customers are being led to believe that the components they purchase are bigger, better, and more capable than they really are.

It's not just the small companies that are guilty. Trusted names like NEC and Creative Labs say they are forced to meet the claims of less-savory competitors just to play in the market. You won't fall prey to unreliable data in the aisles where TV sets and stereo systems are sold—major consumer-electronics companies cleaned up their act years ago. But industry oversight and the lack of standards in the computer arena invite abuse, and consumers are getting taken.

We tested 15 sound boards and compared audio fidelity against the data printed on the product packaging, manuals, and spec sheets. For comparison, we tested consumer audio components—CD players, amplifiers, and tape decks—measuring performance against published data. With monitors, we took a ruler to 39 popular 15- and 17-inch displays, and in the chart on page 74, we report on those with the largest and smallest viewable screen areas. It's risky to rely on vendor data when buying a monitor, PC speakers, or a sound board. Whether you plan to work on wide-ranging spreadsheets that need every pixel or to build multimedia presentations, the lack of clear and accurate product information means you can spend money without knowing what you'll get.

DISAPPOINTED WITH THE VIEW: Real estate appraiser Darwin Calender's new 15-inch display was smaller than his old 15-inch one.

Don't Be Misled by Vendor Specs: Tips for Smarter Shopping

Here's how to work with and around misleading product data.

1. Measure your monitor with a ruler. The advertised diagonal screen size does not correspond to the viewable screen size. Even if measurements are published, it's always a good idea to double-check. To get an accurate measure of viewable screen area, turn on the PC and monitor and use a ruler to measure the distance from the lower-left corner of the screen to the upper-right corner. You might want to use the monitor's front-panel controls to adjust the image size, since some monitors are better than others at producing quality images at the far corners of the screen. Remember to measure only the area containing lit pixels.

2. Scrutinize audio output specifications. Make sure the vendor specifies that rated power output is obtained under continuous operation. This ensures that the vendor is not simply measuring a burst of power, which can be significantly higher than the power available during normal operation. And check that power is provided to both speakers during testing—expressed as *both channels driven*—since cutting output to one speaker can inflate wattage figures. Look for a distortion level of 1 percent or less; vendors can inflate wattage by running tests at high distortion levels.

3. Look for a realistic frequency range. Be skeptical of small desktop PC speakers that claim frequency ranges wider than 50 Hz to 20 kHz. While the human ear can detect sounds between 20 Hz and 20 kHz, small speakers have trouble reproducing sounds at the lower end of this range.

—Geoffrey Coffey

LEFT: GORDON STUDER; ABOVE: GARY MOSS

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PC World, *November 1994*

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Monitors: Eye of the Beholder

When you buy a 27-inch television set, the screen measures exactly 27 inches from corner to corner regardless of the TV's make or model. But purchase a 15-inch monitor for your PC, and that corner-to-corner measurement will be something less. As a result, the viewable area of the screen can be 10 percent smaller than the advertised size, depending on the model and CRT type. A half inch here or there may not seem like a lot, but a 17-inch monitor costs about $500 more than a 15-inch monitor—approximately $125 for each half inch. With Windows applications vying for every last pixel, it's no wonder users put a premium on screen real estate.

Ask Darwin Calender. An independent real estate appraiser in Duarte, California, he needed a 15-inch monitor to replace his original 15-inch display, which had died. Viewable size is critical to Calender because he works with scanned photos and large on-screen forms. But he had no idea that some 15-inch screens are larger than others—until he noticed that his new display was noticeably smaller than the original monitor.

"Both the new monitor and the one I had before were rated at the same size, but somehow I remember the image looked better on the old one," he says. "When I measured the new monitor, it turned out to be only 13¾ inches. When you buy a TV, they lay out all the features. The measurements are consistent, so you know what you get for the price."

TV, PC, CRT

Monitor vendors, unlike TV manufacturers, rate and market their products based on the size of the CRT inside the monitor chassis. But the CRT must be mounted inside a frame—which includes the monitor's faceplate, or *bezel*—reducing usable screen area. Also, the difficulty of displaying precise graphics at the far corners of the screen means CRT tube and monitor manufacturers cannot guarantee adequate image quality there—even if controls let you stretch the image to the edge of the visible glass. That means the area of the screen a user might consider viewable is often noticeably less than the area of glass inside the bezel. Even so, when we measured these products, we gave vendors the benefit of the doubt and stretched the image as far as possible before putting ruler to the screen.

Drastic Measures

The nine 15-inch monitors we measured yielded an average viewable diagonal screen size of about 13.9 inches. And while the area of a true 15-inch screen should be 108 square inches (based on an aspect ratio of 3 to 4, or simply 9 inches high by 12 inches wide), the viewable area of these monitors averages less than 93 square inches, or 86 percent of the total CRT area. One of the monitors, the Philips Magnavox CM4015, provides more than 14 diagonal inches of usable

The Big Picture: How Big Is It Really?

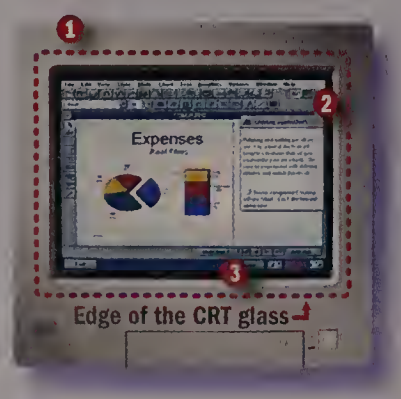
17-inch monitors

Model	Street price	Viewable diagonal (inches)	Viewable area (square inches)
LARGEST VIEWABLE DISPLAYS			
IBM 17S/S	$1410	16.1	122.9
CTX 1785GM	$750	16	122.5
Mag MXP17F	$950	15.9	121.3
SMALLEST VIEWABLE DISPLAYS			
Nokia Multigraph 447X	$1029	15.5	115.2
ADI MicroScan 5EP	$769	15.5	114.5
IBM 17P	$1199	15.5	114.5

15-inch monitors

Model	Street price	Viewable diagonal (inches)	Viewable area (square inches)
LARGEST VIEWABLE DISPLAYS			
Philips Magnavox CM4015	$379	14.2	96.9
Mitsubishi Diamond Pro 15FS	$425	14	94.4
Sony Multiscan 15sf	$450	13.9	92.5
SMALLEST VIEWABLE DISPLAYS			
Apple Multiple Scan 15	$509	13.7	90.2
NEC MultiSync XP15	$695	13.7	89.5
IBM 15P	$699	13.5	87.9

The Mystery of the Missing Screen Area



PC monitors and televisions share many attributes, including the technology that puts images on the glass. To maintain legibility, however, monitors must operate at much higher resolutions and repaint the screen many more times per second than televisions. While TVs can take advantage of the entire screen, monitors have a front plate, called the *bezel*, which hides the edges of the CRT and reduces viewable area.

1 Although the bezel helps mount the CRT in the monitor, it obscures part of the CRT glass in the process.

2 Close to the edge of the screen, most monitors can't keep pixels focused and evenly shaped. This problem occurs when the electron beam that paints pixels on the screen hits the back of the CRT at an angle. Also, the CRT glass is thicker near the edges than at the center, further reducing image fidelity.

3 The no-man's-land of monitor measurements runs from the edge of the bezel to the area on screen where display fidelity begins to break down. Some monitor makers have specifications defining where usable screen area ends on their products, but the industry as a whole has not agreed on a standard.

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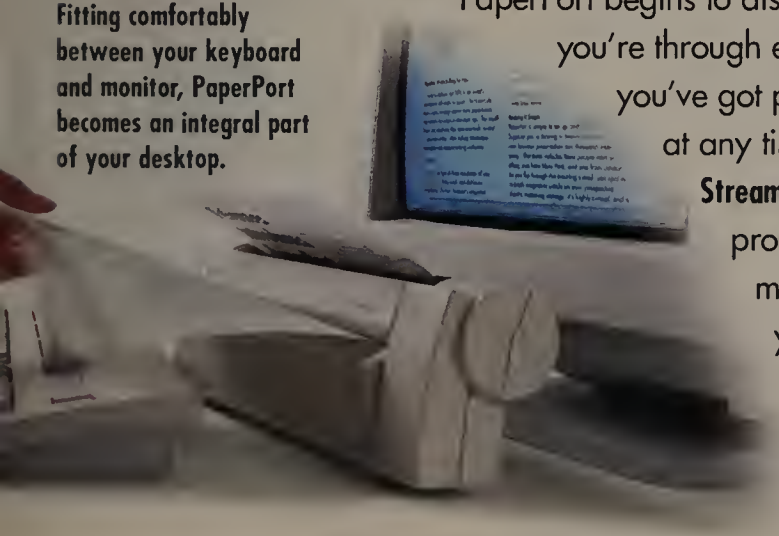

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display space. That translates into around 96 square inches of usable screen area. The loser in this crowd: The IBM 15P, with a viewable diagonal measurement of only 13.5 inches.

Little Big Screens

The thirty 17-inch models we tested have an average diagonal measurement of about 15.8 inches, or 86 percent of the area that you would expect. And the average viewable screen area of less than 120 square inches is well short of the 139 square inches a true 17-inch screen should deliver. The largest viewable screen belongs to the IBM 17S/S, which measures 16.1 inches from corner to corner, for about 123 usable square inches. The smallest viewable measurement? The IBM 17P musters just 15.5 inches of diagonal viewing—not even 1½ inches larger than the biggest 15-inch models—with a viewable screen area that measures only 114.5 square inches.

Why are monitors still being sold this way? Market leaders like Sony and NEC will tell you that smaller vendors force them to maintain the current practice. "If we went to 13.8 inches as our primary measurement for our 15-inch CRT models, it could cause confusion in the market and a short-term advantage to others," says NEC's Wayne Hinson, director of marketing for the MultiSync Display Group.

But even reluctant manufacturers can't delay the issue much longer. The California attorney general's office is investigating a complaint that the practice of marketing monitors by CRT size constitutes deceptive advertising. A ruling may be made this summer.

In the meantime, monitor vendors are working with the Video Electronics Standards Association, an industry standards organization, to develop a universal method for determining viewable screen size.

In addition, major vendors such as IBM, NEC, Sony, and Samsung have begun displaying measurements for actual viewable screen size on their marketing materials.

PC Audio: Seeing Ain't Believing

Ever since sound board makers achieved 16-bit, 44.1-kHz playback and recording—identical to the digital quality of audio CD players—vendors have boasted that their products produce CD-quality sound. Makers of PC speakers, meanwhile, often make lofty power output claims on their packaging, implying that their products can produce high volume levels. Worse, both groups often provide incomplete data, leaving buyers to guess about critical performance issues. To find out if these products deliver on their promise, we ran 15 boards and three representative powered-speaker systems through a battery of audio tests, comparing the results against advertised performance as well as against a sampling of consumer audio equipment.

We tested output power, signal-to-noise ratio, and signal strength and display test results for selected products. *Output power* defines how much volume an amplifier can produce

When a Watt Isn't: PC Audio Specs Can Lie

In tests, output power of sound board amplifiers and PC speakers failed to measure up to vendor claims. Consumer audio products consistently achieved or exceeded specs provided by vendors.

☑ Legitimate ☒ Overstated

PC sound boards		Claimed watts	Tested watts
Creative Labs Sound Blaster AWE32	☒	4	1.4
Media Vision Pro 3D	☒	3.9	2.7
Western Digital Paradise DSP-16	☒	4	2.3
PC speakers		**Claimed watts**	**Tested watts**
Altec-Lansing ACS31 powered speakers	☒	12	5.2
Reveal RS380 powered speakers	☒	40	4.5
Yamaha YST-M10 powered speakers	☒	10	4.7
Consumer audio equipment		**Claimed watts**	**Tested watts**
Adcom GFA-535 amplifier	☑	60	81
Denon DRA-365R stereo receiver	☑	48	48

Data based on tests designed and conducted by PC World Test Center.

Are We Having Fun Yet?

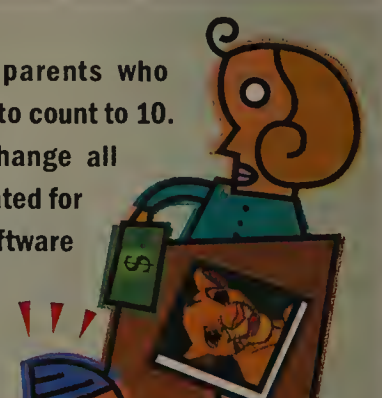
Last year's multimedia-computer feeding frenzy gave indigestion to users of CD-ROM software. While consumers snapped up millions of computers in 1994, many found that their shiny new CD-ROMs didn't work, and they returned the products in droves.

Estimates of the rate of return vary. Some analysts place the figure as high as 40 percent. However, a number of manufacturers, such as Sanctuary Woods of San Mateo, California, claim their returns are below 1 percent. Industry watchers estimate that most commercial outlets fall in the middle: 20 to 25 percent of their CD-ROM software walks right back in the front door.

Hassles with hardware installation and configuration are a key factor. Poorly configured systems, sound-card incompatibilities, and insufficient RAM can stymie parents who merely hope to teach their children to count to 10.

Plug and Play is supposed to change all that—but when? Windows 95, now slated for an August arrival, will provide the software end of the Plug and Play equation. In the interim, look for Intel Plug and Play software, but be prepared to configure in DOS.

The oldest caveats still apply—know your system inside and out, read the package, and ask a lot of dumb questions.



LEFT: GORDON STUDER; ABOVE: JOHN GREENLEIGH

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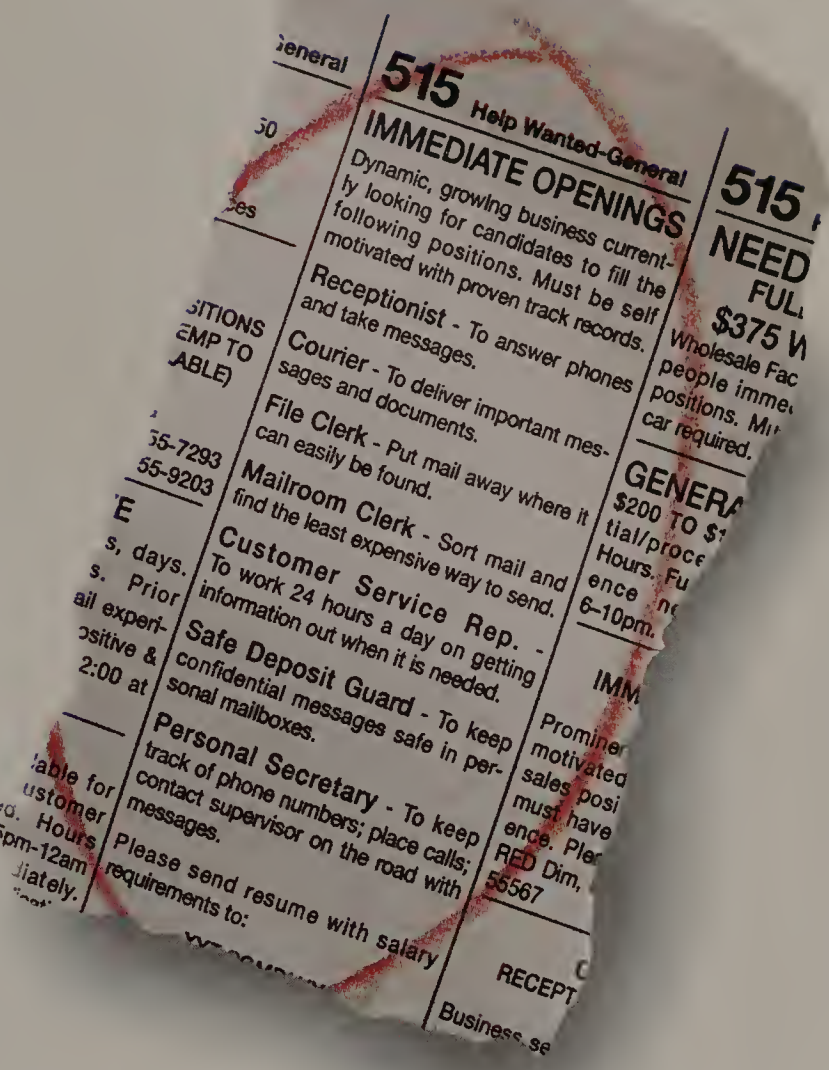

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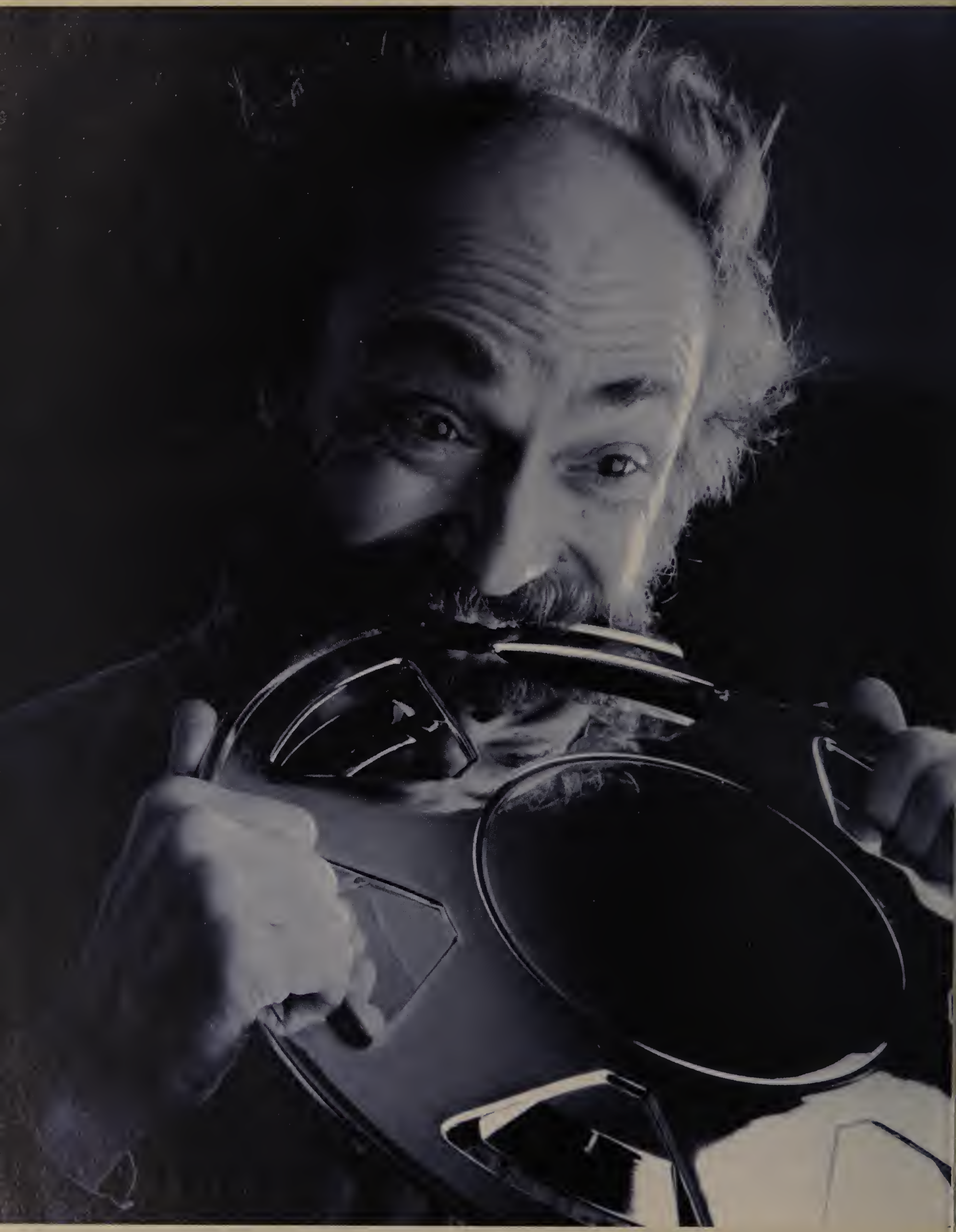

Since 1975, Ivan Opachevsky's somewhat unorthodox diet has included, 6 cars, 10 shopping carts, 8 TV sets, 3 computers, 1,000 record albums and a twin-engine airplane.

Because he seems to thrive on doing things the hard way, he is undoubtedly one of the few people not interested in Delrina Communications Suite.

Mr. Opachevsky knows there are easier ways to get his daily dose of iron. So he probably won't care that Delrina Communications Suite™ is the easiest way to fax and go on-line. You, however, will be pleased to learn that the world's best-selling fax software, Delrina WinFax™ PRO, and the powerful communications software, Delrina WinComm™ PRO, are now available together in one economical, easy-to-use package – Delrina Communications Suite. WinComm PRO gives you push-button connections to most major on-line services, like CompuServe™ and MCI Mail.™ You get all the important file transfer protocols, the most popular terminal emulations and a whole lot more. It lets you send and receive Internet e-mail off-line. Plus learning it is a piece of cake, since both applications share the same intuitive interface. WinFax PRO lets you send and receive faxes with your PC from any Windows application – eliminating countless trips to the fax machine. Sending a fax is as easy as printing a document. You can even receive faxes in the background while you work in another application. And you can organize and manage your faxes with handy drag-and-drop folders. So visit your local software dealer today, or call us at 1-800-270-8031 to order or upgrade. Once you try Delrina Communications Suite, you'll be so much more productive with your PC, you won't be tempted to eat it.

Delrina Communications Suite includes both WinFax PRO and WinComm PRO.

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on-line services, and features Delrina's Internet Messenger™ for sending and receiving Internet e-mail. You can get WinFax PRO and WinComm PRO together in Delrina Communications Suite.

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while maintaining acceptable fidelity—a specification critical for powered speakers, though it also applies to the small on-board amplifier on a sound board. *Signal-to-noise ratio* measures how clean an audio signal is after it has passed through a sound board, with higher numbers indicating a lower level of unwanted noise compared to the original signal. Finally, the *signal strength* test determines whether components can accept strong, rich audio signals without distorting the sound.

Unsound Boards

Most of the sound boards we tested failed to meet advertised specs, nor could they match the performance of the consumer CD players they purported to rival. Worse still, only 3 of the 15 sound boards provided usable microphone performance—most of the boards suffer from a variety of basic audio problems that made it virtually impossible to record undistorted speech or sound.

The PC speakers we tested fared no better, failing to meet the power levels reported on their packaging and documentation. By contrast, the consumer amplifiers, receivers, tape decks, and CD players breezed through our tests, consistently meeting or exceeding rated specifications.

These results did not surprise Michael Brown, an associate editor at *Electronic Musician* magazine. "You have to consider what these guys are promising for the money. If you look at the numbers printed on the boxes of these cards, you've got to know something's strange."

Consider the Reveal RS380 speaker system. In large letters on the box, it claims output power of 80 watts—enough to fill a small dance hall. Closer examination shows the speakers are rated at 40 watts per channel, which means the vendor added the wattage of the two channels to achieve that figure—a definite no-no in the audio world. An even closer look shows the 40-watt figure is based on peak power output—essentially the audio equivalent of pushing a subcompact car until the chassis shakes apart. When we tested the speakers at a level in line with accepted consumer audio practices, amplifier output measured only 4.5 watts. In fact, none of the three speakers and few of the 15 sound boards we tested met purported output power, even though sound boards generally claim a modest 4 watts of output for on-board amplifiers.

According to Rich Sorkin, the director of audio and communications products at Creative Labs, vendors don't perceive a need to provide verifiable performance data for PC-based products. "If you look at the consumer audio market, you are talking about people spending $99 or more. But less than 1 percent of the speakers sold for desktop PCs reach even the bottom end of that consumer market. Until consumers are willing to spend what they do in the consumer audio market, you won't see the manufacturers putting together that kind of data."

Help Ahead

The situation is already improving, particularly among speaker vendors. Major names in consumer audio, including Bose and Sony, are moving into the PC speaker market—and bringing with them a more rigorous reporting standard.

Until PC monitor and audio vendors agree to disclose verifiable data about product performance, watch your back when you shop. Of course, you do have one effective weapon to combat specious vendor claims—your eyes and ears. No amount of printed data can take the place of a test drive.

—Michael Desmond

Testing conducted by Adam Liberman, an audio engineer and consultant in Oakland, California.

JOHN GREENLEIGH

Sound Quality: Don't Retire Your CD Player

PC sound boards tend to produce more background noise than consumer audio products. We measured signal-to-noise ratios, with high decibels (dBs) indicating better sound quality. Most sound boards we tested fell short of claims.

☑ Legitimate ☒ Overstated

PC sound boards		Claimed dBs	Tested dBs
Ensoniq SoundScape	☒	80	74.4
Logitech SoundMan Wave	☒	80	67.5
Media Vision Pro 3D	☒	75	73.6
Reveal Sound Effects 32	☒	80	69.5
Western Digital Paradise DSP-16	☑	68	69.7

Consumer tape recorders		Claimed dBs	Tested dBs
Denon DRM-540 cassette deck	☑	74	77
Sony TCD-D7 portable DAT	☑	87	88

Consumer CD players		Claimed dBs	Tested dBs
Philips CDC 916 CD player	☑	100	124.6
Sony CDP-990 CD player	☑	110	112.2

Data based on tests designed and conducted by PC World Test Center.

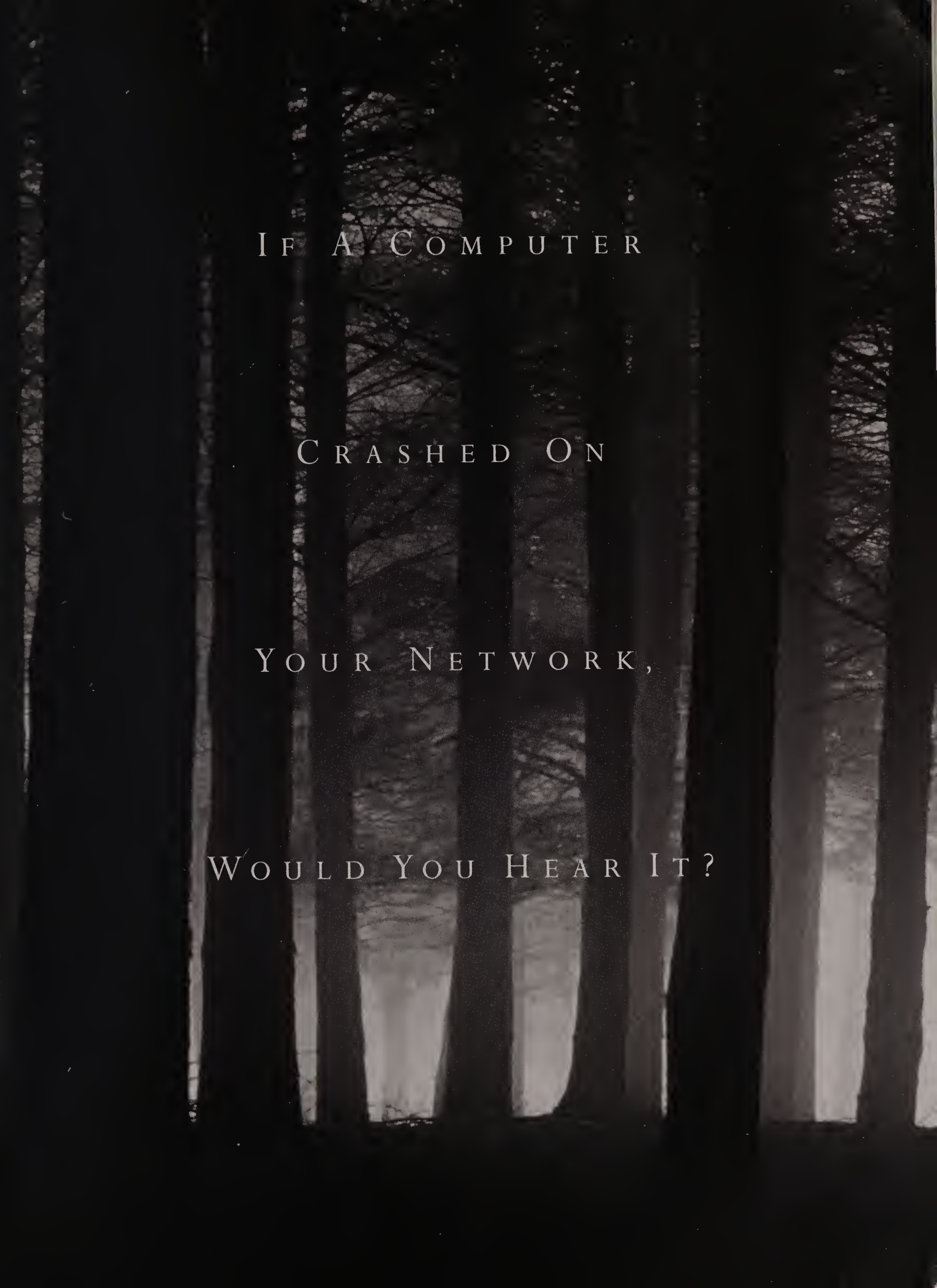
Low-Impact Sound: Boards Struggle When Recording

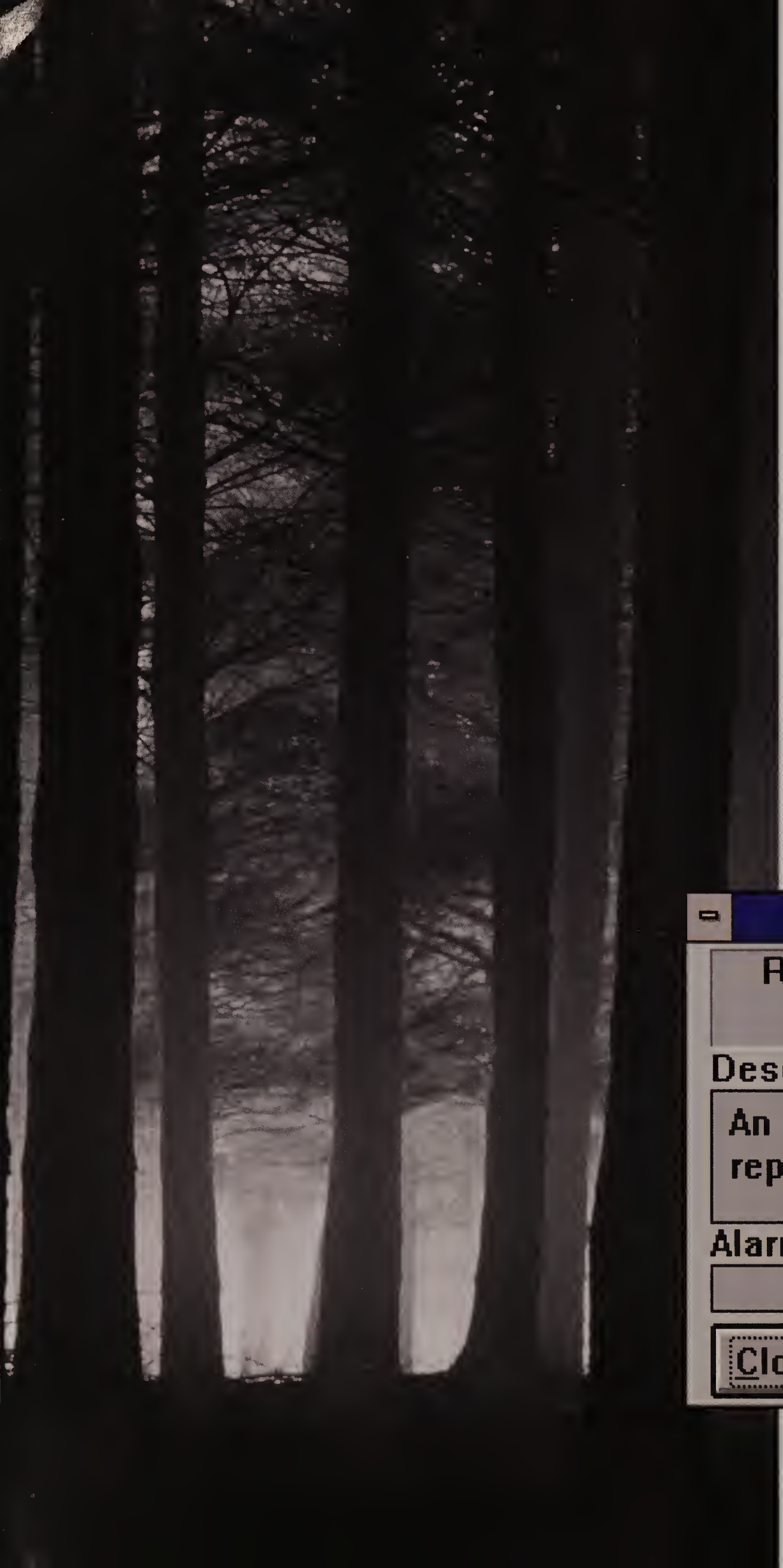
To make acceptable recordings, a sound board must handle a range of signal strengths, with high dBu indicating better quality. Boards we tested cannot accept the +9-dBu signals commonly generated by CD players without distorting the sound. Consumer tape decks outperformed even the best sound boards.

PC sound boards	Minimum acceptable dBu	Tested dBu
Creative Labs Sound Blaster AWE32	+9	+4.2
Ensoniq SoundScape	+9	+1.1
Media Vision Pro 3D	+9	+12.2
Reveal Sound Effects 32	+9	+7.4
Turtle Beach Systems MultiSound Monterey	+9	+15.7

Consumer tape recorders	Minimum acceptable dBu	Tested dBu
Denon DRM-540 cassette deck	+9	+25
Sony TC-D5M portable cassette deck	+9	>+30

Data based on tests designed and conducted by PC World Test Center.


If A Computer
Crashed On
Your Network,
Would You Hear It?



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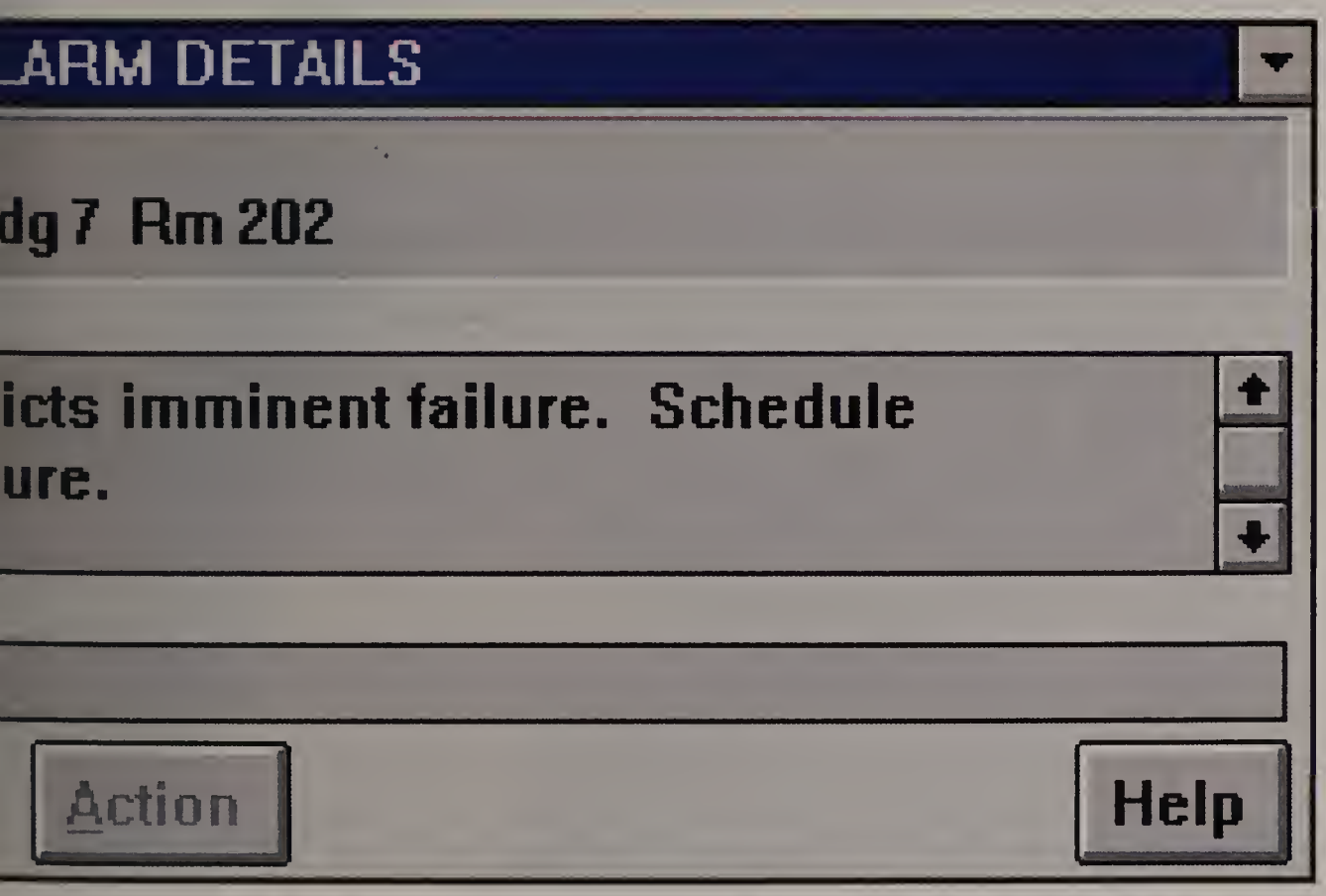

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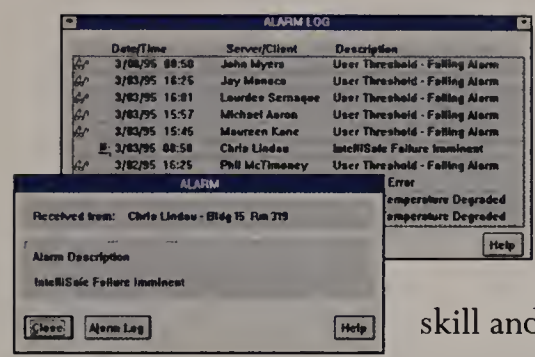

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Wouldn't it be great if you had just a little help? A crystal ball? A sixth sense, perhaps?

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directly to the desk of the network administrator.

Imagine being warned before a hard drive on another floor (or another city) seized up. Or taking a complete PC inventory right from your desk. (Certainly not the kind of cooperation you'd expect from a machine.)

We call it Intelligent Manageability. You'll likely call it "I'm glad someone finally thought of that."

How do we know? Maybe it had something to do with intuition.

COMPAQ

Research proves what you've known all along: only 20% of the lifetime cost of your company's PCs is the initial cost.* The other 80% comes from all the things you do to manage them—like configuring, servicing, upgrading and just keeping track of who's got what. Isn't it time someone found a way to change that?

Asset Management 101. Our newest Compaq Deskpro is the first PC that's as concerned about cutting costs as you are. It all starts with the Intelligent Manageability we mentioned a page ago: a Compaq-designed combination of hardware and software that gives you a new level of control over your networked PCs.

Until now, taking stock of your PC assets has always required you to physically visit your computers one at a time. At every stop, you'd have to examine the PC, take serial numbers, check software, open it up and take a look inside. It's a process that could literally take days.

The new Deskpro changes that. Working closely with the leading companies in the world of LAN management, we built in some powerful features that can be tapped by their new software tools.

And the result is stunning: Now, as network manager, you can look into a Deskpro PC anywhere on the network to take inventory. You can retrieve hardware specifications, including make, model and serial number for the PC, hard drive and monitor, and revision numbers for the system board and ROM. You can also identify system software and drivers.

It's not only good knowledge to have. It makes the job of maintaining and updating PCs vastly more simple.

Fire prevention. When people decide to stop working for you, they usually have the courtesy to give notice. Computers, on the other hand, seem to enjoy the element of surprise.

Again, Deskpro will be changing things. Its Intelligent Manageability actually alerts the user to critical potential problems before they can turn into real ones.

Every time you power up the new Deskpro, its IntelliSafe™ hard drive conducts its own diagnostics. If any of its performance parameters has fallen below acceptable standards, the user is notified. So instead of responding to an emergency, you have ample time to take corrective action—replacing the drive at no expense under the Compaq Pre-Failure Warranty.℠

In addition, our Environmental Fault Protection constantly monitors the internal temperature of your Deskpro to make sure it isn't working under conditions which might imperil your valuable data.

Networking is in our blood. Because setting up a personal computer on a network has turned into one of the most time-consuming pastimes in corporate America, the new Deskpro was built to streamline the process.

Right out of the box, it's configured for your network, with a 32-bit PCI Ethernet NIC or an IBM Token Ring adapter

COMPUTERS THAT TAKE CARE OF THEMSEL

Introducing the latest line of Deskpro computers

* Source: Gartner Group

already installed. The drivers are optimized and industry-standard connectors are in place. And with its simple configuration tools, Deskpro helps reduce the complexity of setting up desktop network software.

Under the hood. The thing that makes our Intelligent Manageability most appealing, of course, is the fact that it's built into an enormously powerful and efficient computer.

With Deskpro, you can choose your processor, from a DX2/50MHz to the most powerful Pentium. And

of built-in Enhanced Business Audio.

Open and accessible. Needs change, goals change and people change. The good news is, a Deskpro computer can change every bit as quickly.

It opens without any special tools. The system board slides out, making it easy to upgrade the processor or add extra RAM. The PCI expansion slots are easily accessed. And the drive cage swings out to make hard drive upgrades painless.

Plus, the Deskpro system board utilizes Flash ROM technology, which

single Deskpro probably won't finance your retirement villa, but the savings from many machines over many years should have a nice effect.)

And when Windows 95 becomes available, Deskpro will make the job of managing your company's network of PCs even easier.

Using new management software tools provided by Compaq and our LAN industry partners, you'll be able to effectively monitor the health of all your networked Deskpro PCs—including the ones hard at work in

S? THIS COULD TAKE SOME EXPLANATION.

every model delivers the enhanced performance of Compaq's new TriFlex™/PCI architecture. In fact, in our latest crop of Deskpro PCs, higher performance is something you can literally see and hear.

Thanks to PCI local bus graphics, you get crisp, responsive graphics even in everyday business applications. (Select 586-class Deskpro models are available with higher-performance VRAM graphics.)

In multimedia models, you get the speed of our new QuadSpeed CD-ROM and the CD-quality sound

allows you to make future upgrades at the board level simply by running a software utility.

With the task of upgrading a PC reduced to minutes, you can allocate your time to more lucrative pursuits.

Future dividends. And then there are the benefits your business will be reaping down the road.

Since all Deskpro models have been designed with built-in power management features that meet the EPA's stringent requirements, they can actually consume less power.

(The savings in a month from a

your outpost six time zones away—without having to leave your desk.

You'll be able to configure your Deskpro so that if IntelliSafe hard drive failure becomes a possibility, it will send you a distress call across the network. Or automatically safeguard its data on a tape backup.

You'll even be able to have Deskpro send remote notification if it should detect potential problems with its built-in network interface card or internal operating temperature.

But then, what do you expect from a computer that takes care of itself?

Introducing the new Compaq ProLinea

The original premise was simple: make a powerful, yet affordable, computer that doesn't come with all the headaches normally associated with the word "value." And in creating the latest Compaq ProLinea®, we built on that premise—by taking the original apart.

We examined it from top to bottom, from the inside out, looking for ways to improve it. Looking to see what new technologies we could add.

THE LATEST PROLINEA HAS AN IMPRESSIVE SAVE FEATURE: IT'LL SAVE YOU MONEY, SAVE YOU TIME, AND SAVE YOUR SANITY.

In the end, we came up with more than a few improvements. Making ProLinea even harder to distinguish from more expensive machines. The fastest processors. Easy upgradability. Simplified maintenance. Features that make it easy to live with on the day you install it, and for years to come.

It all raises ProLinea to a completely new level. (Of course you'll still find the price within reach.)

And that should certainly put your mind at ease.

COMPAQ

Traditionally, the phrase "better value" has always meant someone's cut corners to give you a better price. At Compaq, however, we like to take a different approach.

The result is the new Compaq ProLinea: a family of computers that not only offers affordable prices, it pushes technology many steps ahead. Twelve, to be exact:

Number One. Our first improvement is something you'll notice before you even buy a ProLinea. You get to choose the processor you want—from very fast (486DX2/50MHz) to blindingly fast (Pentium/100MHz). This way, you don't have to buy more performance than you really need. And it's designed so that you can upgrade whenever you want.

Number Two. You may be familiar with the new standard bus architecture called PCI. Basically, it improves upon the previous technology by expanding the data path to 32 bits and radically speeding the flow of information to expansion cards and peripherals. And guess what: Compaq has already enhanced this standard with our new TriFlex/PCI architecture—which is built into every ProLinea model.

Number Three. The PCI architecture also boosts the performance of the graphics subsystem. So even if you're working with general productivity applications like word processors and spreadsheets, you can enjoy a crisp, responsive high-resolution display. If your uses demand more, select 586-class models are now available with higher-performance VRAM graphics.

Number Four. Forgive the acronyms, but there's also a PCI local bus IDE interface. This not only pays off in improved disk performance, but it supports up to four storage devices. Which means you can easily add another hard drive, tape backup or CD-ROM drive when needed.

Number Five. As long as we're on the subject of CD-ROM, multimedia ProLinea models now come with our new QuadSpeed drive (along with Enhanced Business Audio). This gives you faster access to the rich and vast references available on CD-ROM today, from national directories to archives of business publications.

Number Six. However large a hard drive may be, there are those who take it as a personal challenge to fill it up. With the new ProLinea PCs, however, we're determined to make that as difficult as possible. You can choose a configuration with a disk capacity of 270MB, 420MB or 720MB. Any of which should put you well ahead of your burgeoning files.

Number Seven. ProLinea comes with 8MB or 16MB of RAM, depending on the model. And you can easily expand it to 136MB or 192MB—enough to take advantage of new 32-bit operating systems, run several programs at once and work with spreadsheets the size of Madison Square Garden.

Number Eight. ProLinea is filled with features designed to make your life

LIKE MOST PC BUYERS, YOU'R

"BETTER VALUE," SO WE'VE CLEVERL

COMPAQ

easier. It's not only pre-loaded with an extensive online help system and automated setup software, it now has redesigned documentation to help you quickly pinpoint information. It's also optimized to run new operating systems like Windows 95, which will make your future computing easier still. Every model supports the Plug-and-Play standard that will bring a new simplicity to the process of adding expansion cards. (If you add a new network interface card, for example, ProLinea will sense the change and automatically reconfigure its software to support it.)

Number Nine. You decide exactly how expandable you want your ProLinea to be. You can select a desktop model with three expansion slots and three expansion bays or a model with four of each. Or you can choose a five-slot, five-bay mini-tower model that offers maximum expandability without taking up too much of your space.

Number Ten. The new ProLinea PCs have been designed so you can get inside without any special tools. The system board slides out to accept extra memory or a processor upgrade. The hard drive cage swings out so you can swap disks without reaching into inaccessible, finger-bruising areas. And when you snap in a new Compaq hard drive, you won't have to configure any enigmatic jumpers. When you connect the cables, the settings have the good sense to take care of themselves.

Number Eleven. The ProLinea system board now incorporates Flash ROM technology. That means basic system ROM can be updated without major PC surgery. If future system updates should ever become necessary, installing them will be no more difficult than running a software utility and clicking a few buttons on the screen.

Number Twelve. And what about the environment? Using a ProLinea won't by itself repair the ozone layer, but it's certainly a step in the right direction. For the sake of the atmosphere—and everyone who breathes it—our PC manufacturing process is completely CFC-free. And every model is now Energy Star-compliant, which means less wasted energy for the planet and less wasted money on your power bill.

These are the improvements that define our approach to value. (We think you'll agree, it's a lot more rewarding than cutting corners.)

In fact, our new ProLinea does an excellent job of expressing a core belief at Compaq: That is, the smartest way to build better value is to build a better computer.

PROBABLY SICK OF HEARING DISGUISED IT AS 12 IMPROVEMENTS.

Introducing the latest line of ProLinea computers

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information on our full line of Compaq desktop PCs, call us at

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In Canada, we can be reached at 1-800-567-1616.

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New Products

Edited by Jeff Bertolucci and Randy Ross

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AST's Pentium for the Home: Nice Bundle, Ho-Hum Performance

The Advantage Adventure 6075p from AST seems like a bargain for home PC shoppers: $2399 for a 75-MHz Pentium with a quad-speed CD-ROM drive and a 15-inch monitor. But there's a big catch: The system lacks a secondary cache, so it runs slower than most 75-MHz Pentium desktops on disk-intensive tasks such as database applications. We tested a preproduction Adventure 6075p, and the system's overall performance resembled that of an average 100-MHz DX4.

Naturally, AST wants to sell its home PCs at competitive prices, and omitting the secondary cache lowers the cost. By comparison, Gateway's P5-75 Family PC, reviewed in March ("Top 20 PCs: The Pentium Turns 100"), came in at $2499 with a 15-inch monitor. But the P5-75, like most Pentium PCs, has a 256K secondary cache. (Unfortunately, AST doesn't offer the cache even as an option.)

Typically, the secondary cache consists of high-speed SRAM that bridges the slower main memory and the CPU. Without a secondary cache, a CPU must retrieve data directly from main memory. Frequently, this process means the CPU sits idle while waiting for data—a delay that accounts for the Adventure 6075p's poor showing on some of our tests.

AST says many home users won't miss the cache. True, you won't be disappointed in the 6075p's performance with a word processor. However, if you bring disk-intensive work home from the office—demanding applications such as Paradox for Windows—you may notice a speed difference between the 6075p and other 75-MHz Pentium systems.

The absence of a secondary cache is disappointing, because otherwise this is a well-stocked PC from a respected company. Along with the quad-speed CD-ROM drive, the 6075p offers 32-bit graphics, a sound card, a microphone, and speakers. It also has 8MB of RAM and a 540MB hard drive.

The 6075p includes AST Works, a well-designed program that provides a tour of the PC and answers common questions. The PC sets up in minutes and ships with a generous software bundle. AST ranks near the top in *PC World*'s reliability and service surveys and gives you a three-year warranty with a year of on-site service.

But in the end, it's hard to recommend a 75-MHz Pentium system that doesn't always perform like one. If you want a home PC that's a top-flight performer, this AST system isn't your best bet.

—Laurianne McLaughlin

POKY PENTIUM: AST's Advantage Adventure 6075p home PC packs in multimedia features but lacks a secondary CPU cache.

AST Advantage Adventure 6075p

75-MHz Pentium PC performs slower than expected.
AST Computer
800/876-4278
Estimated street price: $2399
Reader service no. 703

One Box Controls Multiple PCs

Call me a nerd, but I own more than one computer. You can't sell them for anything once they're old, and they're too useful to throw away. But things sure get cluttered in a hurry with three machines sitting on a desk. And did I mention how hot it gets in my Houston home office with three PCs and monitors running...in July?

I've found a compelling solution to equipment overload—Rose Electronics' ServeView, a switch box that lets you use a single mouse, monitor, and keyboard to control several computers. Switching from one PC to another is as easy as pressing the <Ctrl> key and entering a number.

While I find the ServeView useful at home, it's also designed for networked environments. Companies can save space and money by stacking their specialized PCs or servers on a rack and buying one good monitor to control them all. The ServeView unit itself is designed to be rack mounted. It's available in configurations ranging from 2 to 16 ports, and you can daisy chain units to support up to 256 computers.

—Joe Abernathy

ServeView

Control multiple computers using one keyboard, monitor, and mouse.
Rose Electronics
800/333-9343
List price: $595 to $1995
Reader service no. 704

Handheld Digital Recorders Let You Speak Your Mind

I do my best thinking when I'm driving. The clouds inside my brain lift, brilliant ideas flood my synapses, and I suddenly remember I forgot to pay the gas bill. Yet the moment I get near a pen or a keyboard, all that brilliance clouds over again. Fortunately, I've discovered three digital devices that let me record these fleeting insights as they strike and make them easy to find later.

Voice It Worldwide's Personal Note Recorder—a gizmo the size of a credit card—holds from 20 seconds to 2 minutes of voice recording in its internal memory chip, capacity depending on the model. The 20-second VT-20 sells for about $50; the 2-minute VT-120 goes for about $100 (there are also 40- and 90-second models).

Like Voice it, Norris Communications' Flashback also works just like a microcassette recorder, but this cool-looking device uses removable 30-minute or 60-minute memory cards, called SoundClips, instead of tapes. The $249.95 Flashback lets you search for entries, tack new thoughts on to the end of previously recorded items, and insert new recordings anywhere you want.

SPEAKING IN TONES: The $399 VIP 9000 Plus lets you record 11 minutes of notes and play them back at specified times.

Sycom Technologies' Voice Input Planner (VIP) 9000 Plus looks like your average handheld organizer, with a two-line LCD, a dinky alphanumeric keypad, and the usual organizer functions—memo pad, address book, and scheduler. But the $399 VIP Plus lets you record 11 minutes of voice notes and then set alarms so the notes play back at specified times.

To check out these gadgets, I carried them around for a few days, recording bits of wisdom.

Geek on Wheels

For my first test, I took the devices mountain biking. In short order, I recorded my first brilliant insight: In my bike helmet and shorts, with a fanny pack full of digital recorders, I looked like a complete geek.

Voice It's VT-20 fit easily in my hand while I rode, and its record, play, skip, and erase buttons were all within thumb's reach. But 20 seconds of storage proved far too brief; even 2 minutes wouldn't be enough for a long ride. Norris's Flashback also operates with one hand, though its two-button controls are less intuitive than the VT-20's. Still, the Flashback is probably the safest choice for someone on two wheels, thanks to a handy wrist strap that leaves fingers free for braking and shifting.

While Sycom's VIP 9000 let me record voice entries using one hand, trying to do anything else proved perilous. For example, to set an alarm I had to press the buttons with my nose, narrowly missing several unwitting pedestrians.

SMALL TALK: The credit-card–size Voice It Personal Note Recorder holds up to 120 seconds of voice recordings.

After that, I switched to four wheels, cruising down the freeway in my 1981 Honda, recording pithy observations, and listening to ZZ Top's "I'm Bad, I'm Nationwide." Insight number two: The recorders differ noticeably in sound quality. The VT-20 produced consistently crisp recordings with minimal background noise. Flashback's entries were crackly yet audible, but Sycom's VIP 9000 made it sound like I was trapped in a fire at a cellophane factory. Even in a quiet setting, the VIP had the poorest sound quality of the lot.

Now What?

Next, I had to do something with my digitized thoughts. With the VT-20, my options were to transcribe them manually or erase them to make room for new entries. By the time you read this, the Flashback and the VIP 9000 will be able to download voice files to your PC's hard disk—the Flashback SoundClips card will plug into any PC Card (formerly PCMCIA) slot; the VIP will transfer voice and data files via a serial port link.

You'll be able to save the downloaded recordings as WAV files and play them back using a sound card—useful if you want to transcribe an entry in your word processor, attach a voice comment to a Windows document, or simply store a recording for reference. Me, I didn't have any thoughts worth saving, though I did record a wicked vocal on "I'm Bad, I'm Nationwide."

—Daniel Tynan

Norris Flashback, Sycom VIP 9000 Plus, Voice It Personal Note Recorder

A trio of digital devices that record your thoughts.

Norris Communications
619/679-1504
List price: $249.95; 30-minute SoundClip $69.95, 60-minute SoundClip $99.95
Reader service no. 705

Sycom Technologies
800/773-2503, 610/660-5770
List price: $399
Reader service no. 706

Voice It Worldwide
800/999-3522 ext. 40
List price: $49.95 to $99.95
Reader service no. 707

What makes SAMTRON MONITORS *such a great value?*

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Producing high quality monitors is our only business. In fact, our commitment to quality has been recognized by the leading testing facilities in the U.S. According to the NTSL lab report in the January 1995 issue of BYTE magazine, "The Samtron SC-728SXL earned the best overall image quality rating". In their December 1994 issue, Windows Magazine wrote "It's not often that high quality comes at a midrange price. But Samtron's SC-728SXL, with its truly flat 17-inch screen is an exception. Right out of the box, the quality of this 17-inch monitor was apparent."

JANUARY 1995 BYTE BEST HIGH-QUALITY 17-INCH COLOR MONITOR

WINDOWS

SC-728SXL

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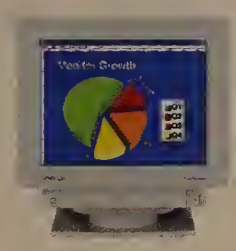

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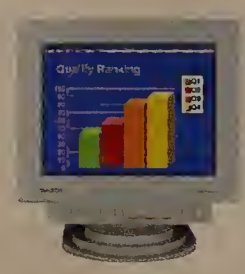
15" 0.28 Dot Pitch
1280 x 1024 (60 Hz)
MPR II



SC-726DXL
17" 0.26 Dot Pitch
1280 x 1026 (76 Hz)
MPR II Mac Compatible

SC-208DXL
20" 0.28 Dot Pitch
1280 x 1024 (76 Hz)
MPR II Mac Compatible

Resellers circle 204 on reader service card

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Circle 213 on reader service card

Sony CD-ROM Discman: Data to Go

What do you get when you cross a portable audio CD player with a double-speed CD-ROM drive? Sony's CD-ROM Discman, of course. Sony's newest walkabout comes in a sleek 10-ounce package powered by two AA batteries. It'll run anything from a multimedia encyclopedia to the latest Alice in Chains CD. With parallel port and PC Card (aka PCMCIA) versions available, the Discman is a natural for the business traveler with an ear for music.

The CD-ROM Discman is available in four configurations. Each bundle comes with a Discman player, stereo headphones, cabling, an AC power adapter, and installation and player software for DOS and Windows. The entry-level Model PRD100 includes a parallel port Discman, and lists for $379.95. At the high end, the Model PRD155SB includes the Discman player with a PC Card Type II bus connector and a modular Soundbox and lists for $749.95. The Soundbox, developed jointly by Sony and Compaq Computer, combines a stereo sound card and a set of stereo speakers in a module no bigger than a pack of cigarettes.

As an audio CD player, the CD-ROM Discman provides ten playback modes, including 22-track programming, shuffle, and repeat. As a CD-ROM drive, the Discman supports data transfer rates up to 300 kilobytes per second—not as fast as today's quadruple-speed drives but enough for most multimedia purposes. The major drawback is the Discman's flimsy case. The clamshell-style casing is made of unreinforced plastic, and it doesn't feel particularly shock resistant. One good jolt, and you could find yourself out a lot of clams.

—Susan Silvius

SONY'S PORTABLE CD-ROM DISCMAN does double duty as both a CD-ROM drive and a CD audio player, but it suffers from a flimsy clamshell-style casing.

Sony CD-ROM Discman

Battery-operated audio CD player and CD-ROM drive.
Sony Electronics
800/766-9236, 201/930-1000
List price: $379.95 to $749.95
Reader service no. 708

Bargain Bounty: 17-Inch Monitors for $600

As recently as a year ago, only graphics professionals could justify the expense of a 17-inch monitor. But recently these big-screen displays have been making the difficult transition from niche products to mainstream business tools. Monitors that might have cost $1200 two years ago dropped to the $800-to-$1000 range in the last year. Now with the introduction of two new monitors from Epson and Princeton Graphic Systems, the buy-in for a respectable 17-inch display has fallen to just $600.

These aren't the first 17-inch monitors in this price range, but previous offerings forced you to accept high dot pitch and low refresh rates. These two monitors, while plainly bare-bones, deliver the features that count.

For $599, the Epson 17" SVGA gives you a 17-inch flat square screen with a .28mm dot pitch—not as fine as on some monitors but perfectly respectable. You also get the usual front-panel controls: brightness; contrast; horizontal and vertical size and positioning; pincushioning; and trapezoid (the latter two correct lopsided screen geometry). In theory, the 17" SVGA displays 1280 by 1024 resolution, but in reality you won't want to venture above 1024 by 768. The monitor delivers 1024 at a flicker-free 70-Hz refresh rate, while at 1280 by 1024, you get an eye-straining 60 Hz.

So what does the SVGA make you do without? A bit of screen, for starters. Despite its 17-inch tube, the display's viewable image measures only 14.8 inches diagonally.

With a list price of $629, Princeton Graphic Systems' Ultra 17 closely resembles the Epson 17" SVGA. The Ultra 17 also uses a 17-inch flat square tube with a .28mm dot pitch, supports resolutions up to 1280 by 1024, and displays 1024 by 768 at 76 Hz. The PGS supports the same power-saving standards as the Epson. Unfortunately, the Ultra 17 also shares some of the Epson monitor's shortcomings: Its active display area is just 14.4 inches, and the antiglare treatment isn't as good as on many pricier 17-inch monitors.

While Epson America provides only a one-year warranty, Princeton Graphic Systems gives you a three-year limited agreement—a premium usually available only with more expensive models.

—Dan Miller

Epson 17" SVGA, Princeton Graphic Systems Ultra 17

Two 17-inch displays hit the $600 price point.
Epson America
800/289-3776 ext. 3000
Estimated street price: $599
Princeton Graphic Systems
800/747-6249
List price: $629
Reader service no. 709

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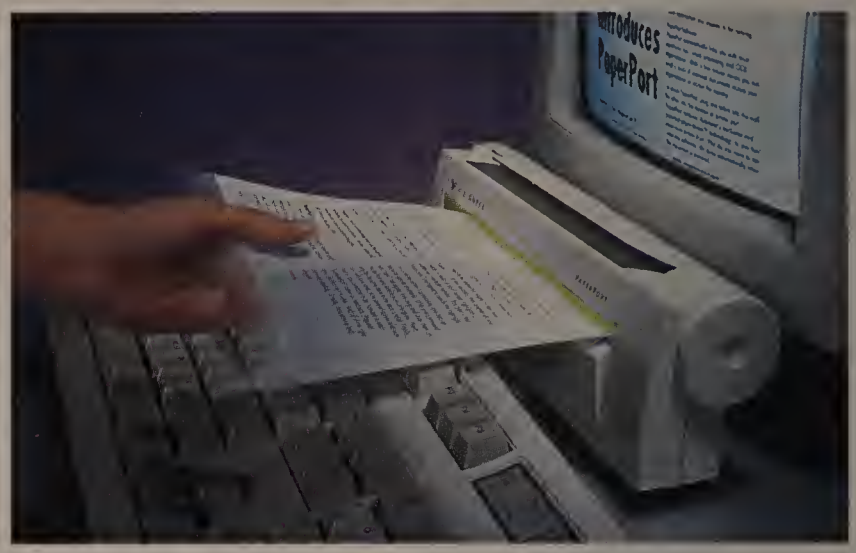
PaperPort 2.0: Speedy Scans and a Paperless Desk

My desk is littered with paper, so I jumped at the chance to try Visioneer's PaperPort 2.0, a slick scanner-and-software combo previously known as the PaperMax and the MaxMate. The PaperPort promises to sweep every letter, invoice, business card, clipping, and matchbook cover off my desk and into my computer, keeping every scrap neatly organized. This I had to see.

No-Hassle Installation

The PaperPort shattered every myth I've believed about scanners: that they take up lots of room, are difficult to install, and cost an arm and a leg. The device is small—no bigger than an egg carton—and fits comfortably on a corner of my desk. I found the PaperPort surprisingly painless to set up: I simply used a supplied cable to connect the scanner to an unused serial port, then installed the software. It was up and running in 15 minutes. (If your system has a serial mouse and an external modem, you're probably out of serial ports—and out of luck. You'll need to use a bus mouse or buy a new I/O card with extra ports.) The PaperPort lists for $399, a pretty reasonable price for a scanner, and sells for about $379 on the street.

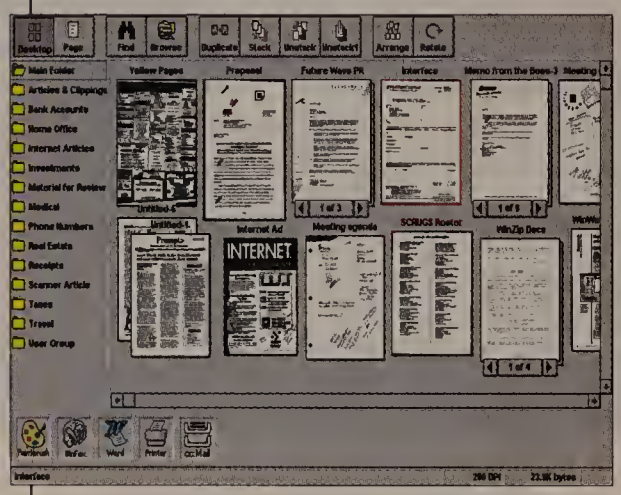
The PaperPort doesn't have an on-off switch. You just stick a document into the scanner slot to get started; it doesn't matter which Windows application you're in. The product now offers improved drawing tools for annotating documents, resolutions from 200 to 400 dpi, and the WordScan optical character recognition (OCR) software from Caere.



FAST, COMPACT SCANNER: PaperPort weighs just 2½ pounds and scans a typical business document in a few seconds.

Scanning Maniac

I started by scanning everything in sight. The scanned documents appeared almost instantly on my screen; most took less than 6 seconds to scan, with business cards taking as little as 2 seconds. (To get these fast scan rates, I set the PaperPort to 200-dpi resolution—more than adequate for most of my documents. For better OCR accuracy on documents that have small print, such as magazine articles or footnotes, you will want to increase the resolution to 400 dpi). There's also a Photo mode for scanning images. For instance, when I scanned an 8½-by-30-inch newspaper clipping (the PaperPort's maximum page length is 30 inches), the device automatically straightened the document and trimmed the dark edges, and I could flip and rotate the page and clean up all the stray dots.



RID YOUR DESK OF PAPER CLUTTER: PaperPort scans all your documents and neatly organizes them into folders.

I scanned 50 documents in no time, and the PaperPort's Thumbnail mode let me display miniature images of more than 20 documents at once. To view a document in full screen, I simply clicked its thumbnail image; by dragging one image on top of another, I organized my electronic documents in stacks—not unlike what's on, or rather what *was* on, my desk.

Remember What You Scan

File management in this version of PaperPort is improved. Above each thumbnail image is enough space for a 32-character title. Using a drop-down menu, I added summary information, including creator name, keywords, and comments. I also annotated the documents with multicolored notes and highlighted text with an on-screen marker. Using this information, I was later able to find a document quickly.

This was exciting. I could see my desk again and was beginning to feel organized. I started dragging stacks of documents into folders. Using the bundled WordScan OCR package, I converted many of my newly scanned documents into editable text. The PaperPort made it easy: I simply dragged a document to the Word for Windows icon, and—voilà, WinWord launched with the document already loaded. When I dragged a document to the fax icon, the PaperPort used my fax-modem and my copy of Delrina's WinFax Pro to transmit the document.

The remarkable PaperPort scanner is ideal for casual users as well as business professionals who want to create electronic versions of every scrap of paper in the office.

—Steve Bass

PaperPort 2.0

Fast, compact scanner with software for organizing your documents.

Visioneer

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Circle 96 on reader service card

Model 2010
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18.8" viewable image size; digital on-screen controls include RGB, color temperature, zoom and tilt; 30 memory settings (18 user storable); anti-reflection, anti-static coating (AR-ASC); .28mm dot pitch; dynamic focusing; up to 1280x1024 @ 77 Hz, flicker-free; auto-scan to 1600x1280 NI; MPR II compliant; VGA and BNC inputs.

Model 1727
17 inch Color Monitor

FST, 16.1" viewable image size; digital on-screen controls include zoom, tilt and auto diagnostic; 34 memory settings (27 user storable); non-glare, anti-static coating; .28mm dot pitch; dynamic focusing; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.

Model 1527
15 inch Color Monitor

FST, 14" viewable image size; digital on-screen controls include RGB, color temperature and zoom; 40 memory settings (32 user storable); non-glare, anti-static coating; .28mm dot pitch; up to 1024x768 @ 76 Hz, flicker-free; auto-scan to 1280x1024 NI; MPR II compliant.

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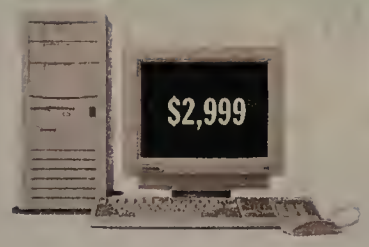
Choose Your Compaq ProLinea

			
Processor	486DX2/66	Pentium 75MHz	Pentium 75MHz
Processor Upgradable	Yes	Yes	Yes
Std./Max. Memory	8MB/136MB	8MB/192MB	16MB/192MB
Hard Drive	420MB	420MB	720MB
Cache Internal	8KB	16KB	16KB
Cache External	256KB (optional)	256KB	256KB
Local Bus Graphics	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	2MB/4MB
Compaq SVGA Color Monitor	Yes	Yes	Yes
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	4	5
Drive Bays (Total)	3	4	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes
Software Preinstalled	MS-DOS® 6, MS-Windows® 3.1	MS-DOS 6, MS-Windows 3.1	MS-DOS 6, MS-Windows 3.1
Energy Star Compliant	Yes	Yes	Yes
Warranty†	3-Year	3-Year	3-Year

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Two "Advisors" Offer Wise Upgrade Counsel

Sure, we'd all like to be running Pentiums that have loads of RAM, mondo hard drives, and a full complement of high-end add-ins. But in the real world, a little complication called money means that many of us upgrade our PCs a piece at a time, adding a new board here, more RAM there.

Two Windows utilities, both aptly called Advisors, do an excellent job of simplifying the upgrade process. SilverLock's $40 Upgrade Advisor offers detailed information on which upgrades are best for your budget and applications. TouchStone's SetUp Advisor, which goes for about $25, makes the process of matching available PC resources (interrupts, I/O ports, and so on) to specific cards less confusing.

Upgrade Advisor determines your PC's configuration using a resident utility called Dynamic. You then run the main Advisor module, which makes specific brand-and-model upgrade recommendations based on your budget, giving you the most bang for your buck.

The developers did their homework; Upgrade Advisor offers a surprising amount of useful and unbiased information. For example, it recommended an S3-based video board for my PC, but it also pointed out that S3 chips aren't a good choice for speed if you use DOS apps (which I do).

SetUp Advisor is the other side of the upgrade coin. It aggressively pokes and prods your PC hardware and software to find the resources needed for add-in cards. This can be a scary process for beginners; your system may lock up as SetUp Advisor comes across I/O ports that are in use. But not to worry: Just turn off the PC and start it up again. The program then creates a database of available resources—such as COM ports, add-in board slots, and IRQ channels.

Since my PC didn't have a sound card, I opted to install a Sound Blaster AWE 32. I chose the card from SetUp Advisor's database of nearly 400 boards and clicked the Analyze button, and the program produced a detailed report on the settings I needed for the board.

Both Upgrade Advisor and SetUp Advisor depend on the latest product and pricing information. Upgrade Advisor offers regular database upgrades at the minimal cost of about $5; SetUp Advisor users can get free information updates from a CompuServe forum or the company's BBS.

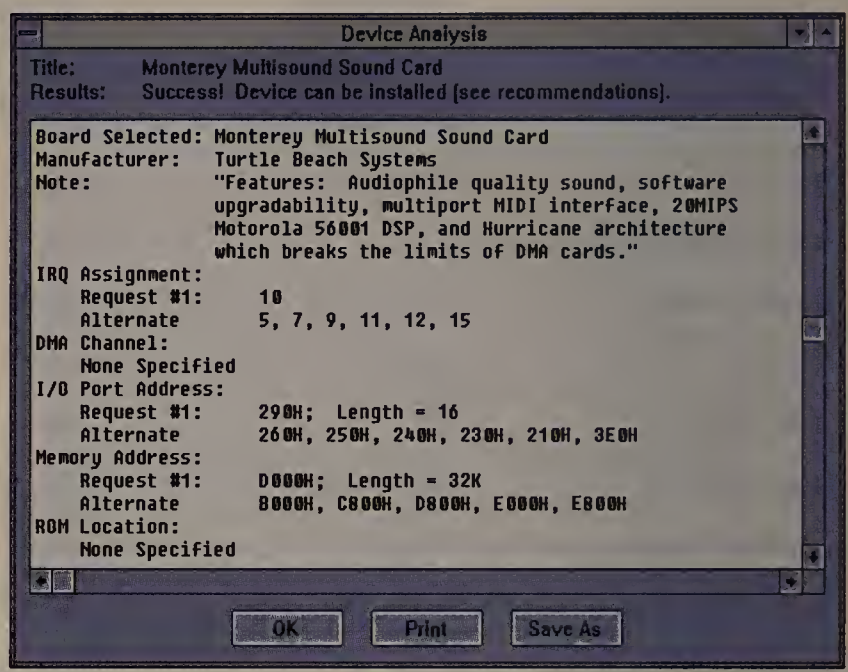
—Stan Miastkowski

Upgrade Advisor

Detailed suggestions to help you upgrade your PC.
SilverLock Software, Inc.
800/665-7894,
714/248-3368
Street price: $40
Reader service no. 711

SetUp Advisor 2.0

Eases upgrade hassles with add-in board setups.
TouchStone Software Corp.
800/531-0450,
714/969-7746
Street price: $24.95, upgrade $14.95
Reader service no. 712



HARDWARE UPGRADES MADE EASIER: SetUp Advisor 2.0 tells you how to set add-in options for your PC.

Get Your Files in Order

Like most computer users, I work on *tasks*, not files. I don't care about file formats. I just want to use text, graphics, sound, and video—and any application that bars me with an "unsupported file format" error message deserves to get nuked.

If you share my point of view, DataCal's Media Commander 1.0 for Windows could be for you. This $129 program lets you view thumbnail images of files and attach personal notes, containing up to 4000 characters, to each file. You also can organize the thumbnail images into libraries; search and retrieve files based on name, keyword, or your notes; and perform limited image editing.

Media Commander supports more than 70 text, graphics, sound, and video file formats. You can either import files, or display thumbnails of those files that Media Commander can't readily gain access to—for example, an image that's stored on a little-used CD-ROM.

Media Commander's tool bars help you access image libraries and tools. Its image manipulation tools let you copy, paste, crop, rotate, resize, zoom, flip, and adjust the brightness. Additionally, you can place cropped portions of an image into another application.

—Shane Rau

Media Commander 1.0 for Windows

Manages text, graphics, sound, and video files in more than 70 formats.
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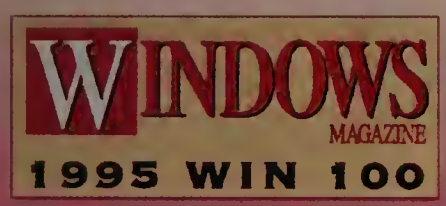

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Circle 138 on reader service card

Satellite-to-PC Link Promises You'll Never Be Lost Again

Some people have no sense of direction. Take me, for example. Put me in a rental car in a new city and I can't even navigate my way out of the airport. But Liikkuva Systems International's Retki GPS Land Navigation System for Windows can help people like me discover where they're at and where they're going.

The GPS, or Global Positioning System, is a U.S. government constellation of 24 satellites that continuously monitor latitude, longitude, and even altitude coordinates anywhere in the world. Retki is a wireless communications system using a GPS-based PC Card (aka PCMCIA) and Windows mapping software to link a notebook to the GPS. Retki can show your current location, find a destination, discover the best route, and show the data on a customized map (available only for the United States).

The $995 Retki can come in handy for lost travelers. Just select *Find Address* from the program's drop-down menu and type in the street address you are looking for. Not only does Retki find and display the location on an on-screen map, it also shows you how to get there from the current position.

Other clever tools in Retki include a James Bond–style tracking system that monitors your travel route and records it on a hard drive or floppy disk. And if you simply point and click on your location and destination, Retki instantly shows your route in graphic terms. Of course, there's a drawback to all of this: You must keep your notebook turned on while you are driving—not the best way to watch the road.

—Michael S. Lasky

WHERE AM I? The Retki GPS Land Navigation System uses a satellite link and mapping software to help you find your way.

Retki GPS Land Navigation System for Windows

Software-and-hardware package links GPS satellites to computer-based U.S. maps for real-time navigation.
Liikkuva Systems Int'l
916/676-0690
List price: $995
Reader service no. 714

Now You Can Negotiate Like a Pro

Not everyone's a born negotiator. If you'd rather have your spleen removed than haggle over a contract, promotion, or business deal, chances are you could use Negotiator Pro 4.5 for Windows. This helpful $189 management tool and expert-systems program helps you plan negotiations, and offers practical, tactical advice on how to carry them out.

You start by answering a set of multiple-choice questions that builds personality profiles of both you and the opposing negotiator. These include such queries as "Can you be described as assertive?" and "Are you a good manager of time?" The program's sophisticated help system explains the significance of the questions.

Based on the negotiators' personalities, the program then creates an "interaction profile" that explains the probable negotiating environment. For instance, you'll learn whether the talks are likely to be straightforward or hostile. Negotiator Pro also describes how to communicate most effectively with the other side and points out traits of your own that might hamper negotiations.

With the profile prepared, you answer essay-style questions in a structured brainstorming session. The program saves your answers as a text file that you can export to a word processor for any additional editing. You can print the finished document—and bring it as a working brief to your negotiating session.

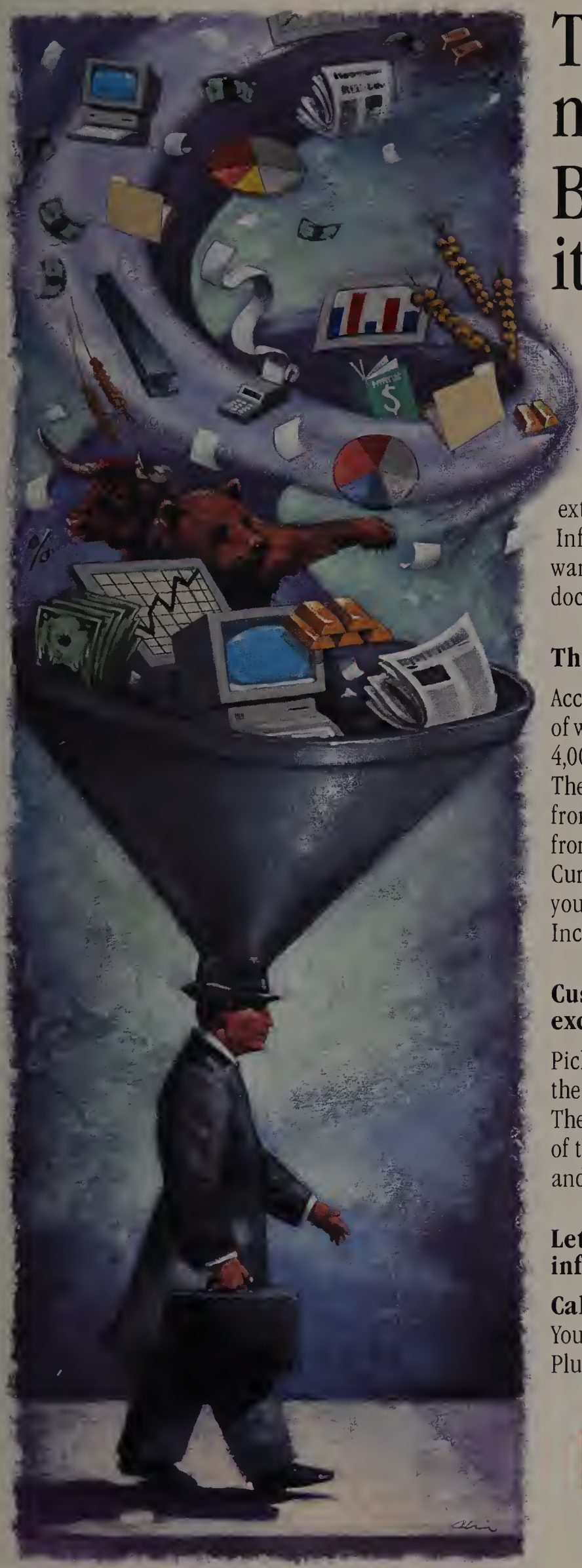
Negotiator Pro can't take your place at the bargaining table. Negotiating is as much art as it is science, and this program is not an electronic Jimmy Carter. To get the most out of Negotiator Pro, you'll have to spend more time preparing for a negotiation than you might be used to. And naturally, for the program to work you must know something about the opposing negotiator.

Its strength lies in assisting your preparation and coaching you on how to become a more effective negotiator. It'll teach you ways to solve differences. Anyone who needs to negotiate on a regular basis, or who wants to boost skill levels, will benefit from this program.

—Jeffrey Gordon Angus

Negotiator Pro 4.5 for Windows

Helps you learn the art of negotiating.
Negotiator Pro Company
800/448-3308
List price: $189
Reader service no. 715



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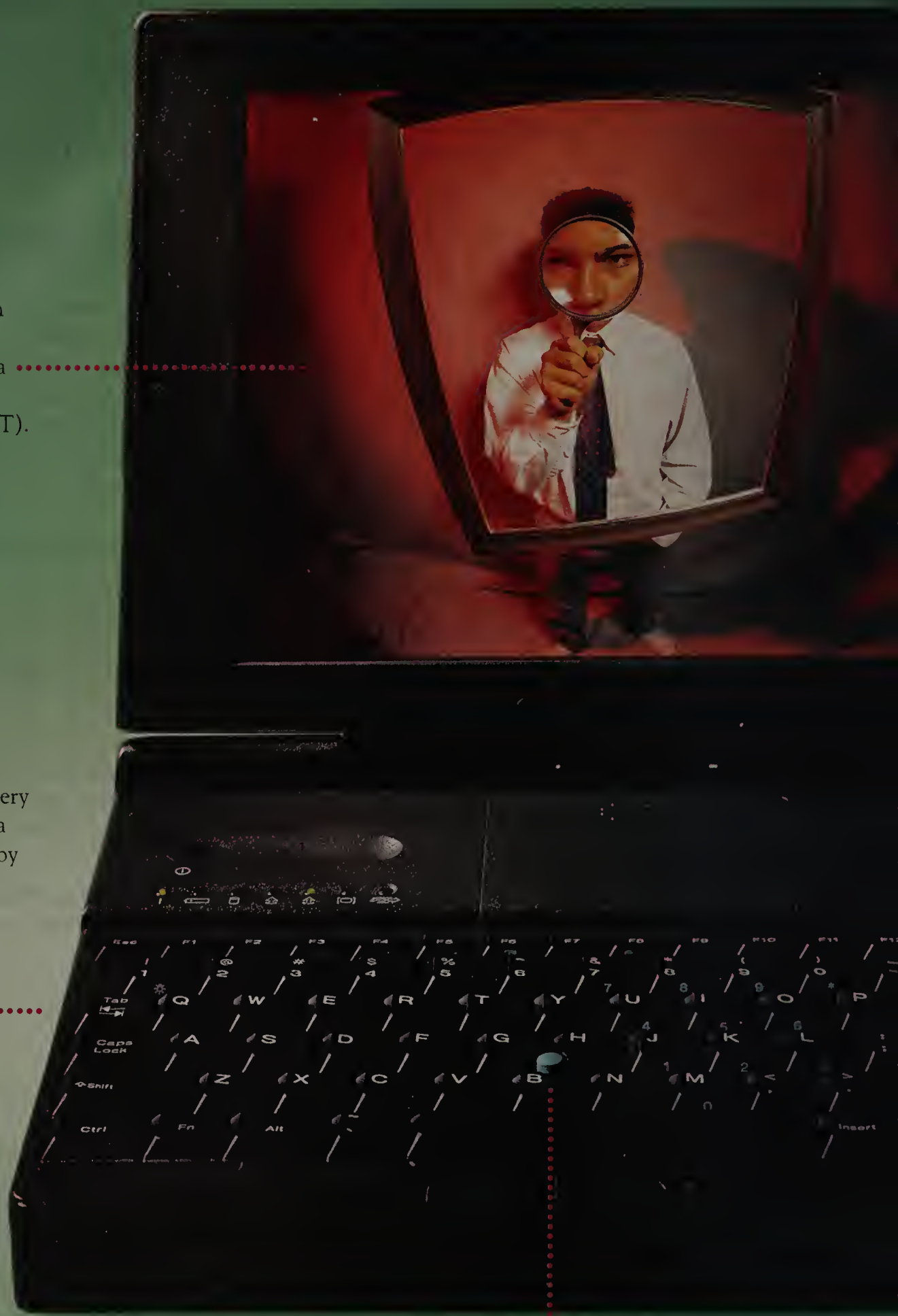
WHAT TO LOOK FOR IN A TOSHIBA, COMPA



See how the screen measures up against the one in a Compaq LTE Elite (10.4"TFT vs. 9.5"TFT).

The lithium ion battery will easily outlast a Toshiba T4850CT by over three hours.

With the SmartPoint trackstick your hands never have to leave the keyboard. Try that with a Toshiba T4850CT external trackball.

intel inside

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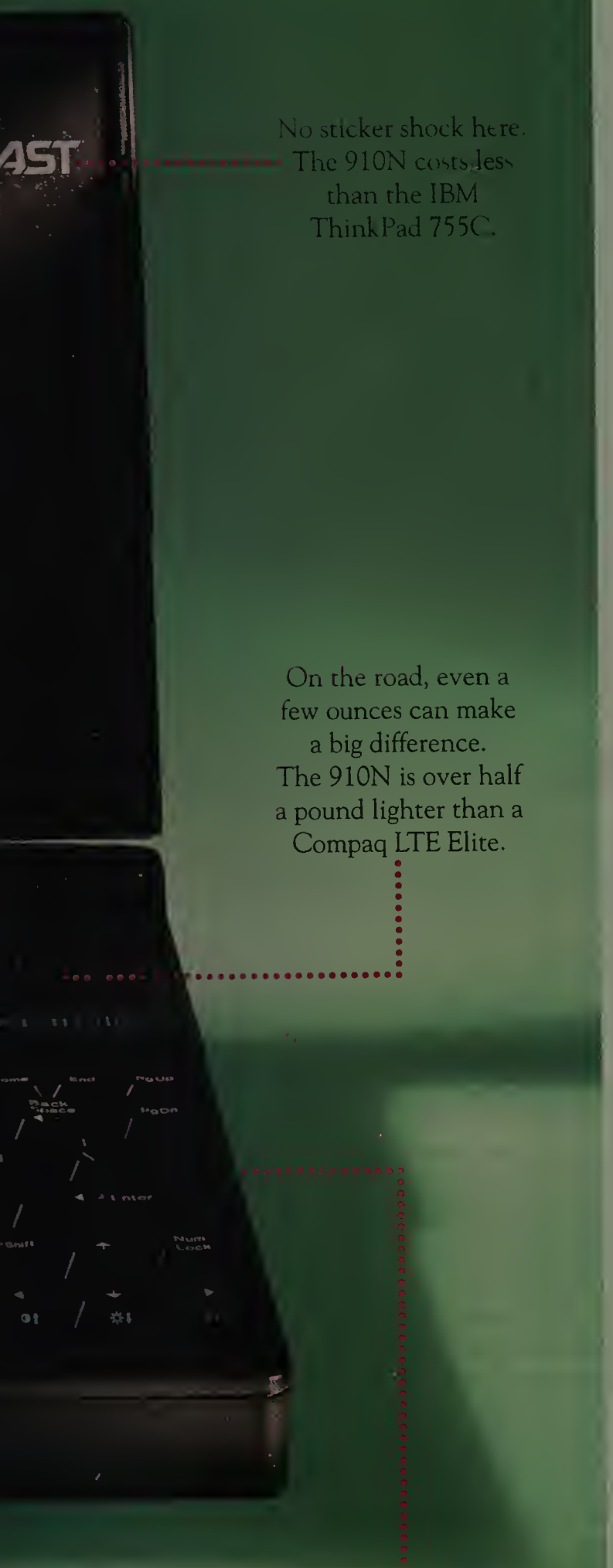

No sticker shock here. The 910N costs less than the IBM ThinkPad 755C.

On the road, even a few ounces can make a big difference. The 910N is over half a pound lighter than a Compaq LTE Elite.

Standard memory, you ask? The 910N features 8MB RAM, compared to the 4MB RAM in the IBM ThinkPad 755C.

With all the choices out there, you're probably asking yourself, "What to buy? What to buy? What to buy?"

Well, maybe this will help. Pictured to your left are a few comparisons to illustrate how the new AST Ascentia 910N stacks up against the field.

The 910N gives you the muscle of the Intel 486DX4/75MHz processor. Just imagine this kind of power and speed to crunch your facts and figures.

To see what's going on, there's a 10.4" TFT active-matrix color screen for crisp graphics. And on a single charge, the lithium ion battery lets you work six to ten hours.

As with every Ascentia notebook, the 910N comes with a 3-year worldwide limited warranty.* For a little extra reassurance, we provide a 48-hour repair service** and around-the-clock telephone support. It's what you'd expect from one of the world's largest computer makers.

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Ascentia 910N

Intel 486DX4/75MHz or DX2/50MHz processors

10.4" diag. TFT active matrix or 10.3" DS-STN color display

340MB, 510MB or 700MB removable hard drive

8MB RAM, upgradable to 32MB

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Lithium ion battery: 6-10 hours use

Weight: 6.1 lbs.

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Circle 87 on reader service card

SpinWizard Offers a Carousel of Icons

SpinWizard 1.1 is a nifty little utility for enhancing Windows' Program Manager. You use it to launch programs quickly and to record and use time-saving macros.

On screen, SpinWizard occupies a small window consisting of three rows holding 12 icons each. You can have a total of eight rows—96 icons in all—although all but three are hidden until you access them with the mouse or cursor control keys.

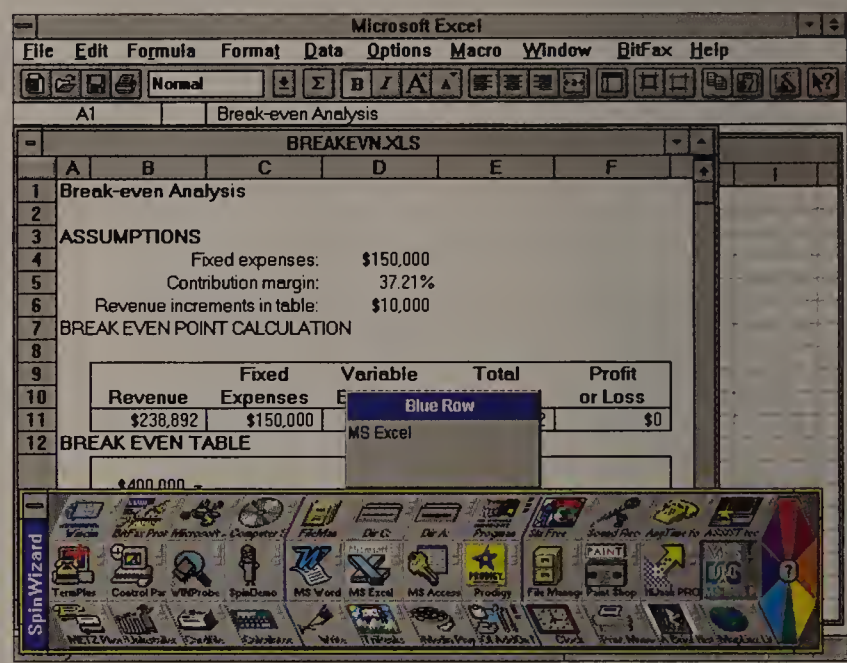
During installation, SpinWizard scans your hard drive to look for applications it recognizes. It's not terribly proficient here, failing to find popular programs such as ProComm Plus for Windows. But adding new icons is a simple drag-and-drop affair from either Program Manager or File Manager.

Once you've loaded SpinWizard, you simply press the <Pause> key to bring the program to the foreground. To launch an application or a macro, you click an icon on the SpinWizard bar or press a function key. To perform basic tasks, such as choosing and labeling icons and recording macros, you click the right mouse button.

As a program launcher, SpinWizard is no more useful than similar utilities already included in Norton Desktop for Windows, Symantec's PC Tools for Windows, and Borland's Dashboard. But SpinWizard's macro function lets you record and carry out complex tasks easily (although it doesn't support DOS applications). You can even save a macro as a file and share your shortcut with others.

SpinWizard is a tidy program, occupying less than 1MB of hard disk space, and it's usable on any Windows PC. It doesn't represent breakthrough technology, but at just $30 on the street it doesn't require a huge financial investment, either.

—Reid Goldsborough



ROUND AND ROUND IT GOES: SpinWizard is an inexpensive macro and program launcher that provides easy access to Windows icons.

SpinWizard 1.1

Windows shortcut utility.
Tanisys Technology
800/460-7746, 512/919-5260
Street price: $30
Reader service no. 716

BizForms Takes the Drudgery out of Electronic Forms

Everybody hates paperwork. There's no fun in filling out invoices, expense reports, purchase orders, and other business forms. If you can't afford to spend long hours designing personalized business documents, JetForm's BizForms 1.0 may be the solution. This easy-to-use Windows-based application helps even novices quickly build and customize a collection of professional-looking forms.

BizForms, which sells for $89, keeps it simple. Two floppy disks and a reference card are all you need to install and use it. The step-by-step approach eliminates guesswork, and there's a wide selection of forms templates. Once you select your business cards, labels, and other templates, BizForms prompts you to customize documents with data and graphics.

BizForms even helps once you've completed the design. You can enter your data into the blank form, then save it with a long, descriptive file name and a date stamp—helpful for finding the form at a later date. And you can include fields for calculating totals, tax, and other numerical data, so you don't have to face the tiring chore of punching the numbers into a calculator. A series of large command buttons along the right side of the screen virtually eliminates any chance of confusion, with print, save, and other functions clearly marked. Finally, BizForms' templates work with popular paper and label stock from vendors such as Avery, Moore, and Paper Direct.

Unfortunately, though, BizForms' ease of use comes at a price. The trouble-free interface lacks scroll bars, keyboard shortcuts, and other conventions veteran Windows users rely on. And the software won't let you build forms from the ground up (although JetForm can create specialized BizForms templates for an additional fee). Furthermore, while BizForms provides clip art that you can put into documents, business users might want more-sophisticated material. But if you want a safe, quick, inexpensive way to produce forms for your home office or small business, BizForms is a good place to start.

—Michael Desmond

BizForms 1.0

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OpenGL 3D graphics, multiple processors, up to 1 MB cache, up to 1 GB of RAM

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We Know You

You need more than a PC with only enough graphics power to play video games. But you don't want to pay exorbitant prices for RISC/UNIX workstations either. Now you can get serious 3D graphics capabilities — without the high cost and proprietary architecture — with Intergraph's new TDZ workstations. These new 3D graphics workstations give you richer configurations, better performance, and higher resolutions than even those RISC/UNIX platforms offer — but TDZs cost thousands less.

With up to **six Intel Pentium™** processors and advanced graphics subsystems, our new workstations let you interactively rotate 3D designs, create realistic animations, and walk through architectural designs — all in **real time**! You can bring your 3D designs to life by mapping textures to surfaces, smoothing jagged lines, providing realistic shading and lighting, and making objects transparent. And, your designs can move at light speed — even at **resolutions up to two megapixels** — because TDZs integrate the industry's first Intel-based OpenGL graphics accelerators with up to 34 MB of VRAM and bus widths as wide as 280 bits. To top it off, Intergraph offers the widest selection of display monitors with your choice of **17-, 21-, and 27-inch monitors**.

TDZ workstations give you great flexibility in how you present your designs by supporting **advanced multimedia capabilities**, such as MIDI and waveform sound and high-quality video. And, TDZs support Plug-n-Play standards and offer up to 10 PCI and ISA expansion slots, so you can easily upgrade your system by adding extra storage and memory.

TDZs offer everything the professional 3D graphics user needs in one system. That's serious business. That's TDZ graphics workstations.

If you need serious, high-performance 3D graphics, give us a call at **800-763-0242** or **1-205-730-5441**. You can also reach us on the Internet at **http://www.intergraph.com**.

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American Megatrends

CADENCE EDITORS' CHOICE AWARD 1994

TDZ graphics workstations are powered by the following features: one, two, four, or six 100 MHz Pentium processors; up to 1 GB of memory; up to 1 MB true zero-wait-state secondary cache per processor; 64-bit memory bus; OpenGL graphics accelerators; 1 or 2 GB Fast SCSI-2 hard disk; 10 MB/sec. Ethernet (AUI and 10Base-T); 5 or 10 PCI/ISA expansion slots; and more!

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Circle 149 on reader service card

This CD-ROM Makes Wealth a Mutual Goal

Add another power tool to your computerized investment kit: Intuit's Your Mutual Fund Selector.

Mutual funds aim to take the sting out of stock, bond, and money market investing by enabling you to pool your funds with those of thousands of other investors—all under the care of a professional fund manager. But choosing from the 5000 or so available mutual funds can be a chore.

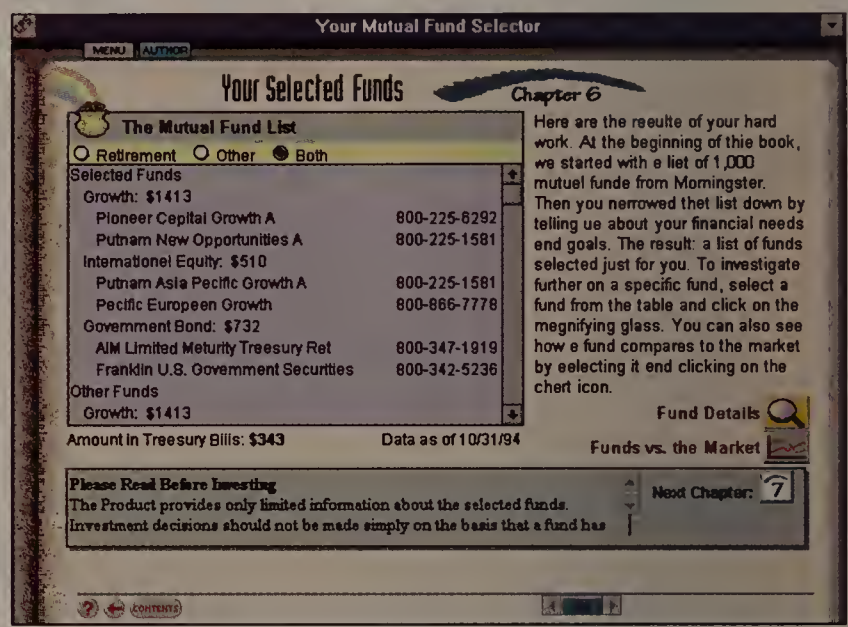
Your Mutual Fund Selector walks you through a six-chapter process designed to do the work for you. Enter goals for earnings, retirement, college—whatever's on your agenda—and the program creates a list of recommended investment options. Informative videos and text explain how mutual funds work and how to make them pay off for you.

I found three problems with this product. Only the top 1000 Morningstar funds are listed, and the information on those funds was several months out-of-date (although the program includes a voucher for one free database update). And I found no way to bypass the limited search tools to browse the entire database. Still, on balance, Your Mutual Fund Selector is a welcome investment tool.

—Joe Abernathy

Your Mutual Fund Selector

MULTIMEDIA **Mutual fund investment coach.**
Intuit
800/624-6930, 415/322-0573
List price: $39.95; database updates available



MARKET MENTOR: Intuit's Your Mutual Fund Selector is an electronic primer for planning your investments.

Moving, archiving and transporting has just emerged from the dark ages.

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RedShift: Planetarium on a Disc

Once in a while a new CD-ROM validates all the hype about multimedia. RedShift Multimedia Astronomy is such a title. With helpful advice from a large portion of the stargazing community—ranging from NASA to the Russian Academy of Sciences—Maris Multimedia has created a stunning planetarium for your computer.

OBSERVATORY FOR YOUR PC: RedShift Multimedia Astronomy lets you examine the heavens from the comfort of your desktop.

It takes time to learn this powerful program, but RedShift's lucid, unobtrusive interface offers a collection of instruction boxes and buttons to help you navigate the heavens. You can choose any date between 4000 B.C. and A.D. 10,000, create various navigational grids, and point your telescope from any point of origin—even from deep space. You can search for any number of star characteristics, such as size, luminosity, or distance. What if you want to view only white dwarfs in the Mediterranean sky at the time of the Caesars? No problem.

But that's not all. RedShift contains maps of the earth, the moon, and Mars. The Photo Gallery has startling images from the farthest reaches of space, including a jaw-dropping look at several nebulae. And the Movie Gallery includes a handful of moon-landing films.

—Richard Overton ▶

RedShift Multimedia Astronomy

MULTIMEDIA The heavens on CD-ROM.
Maris Multimedia (distributed by Maxis)
800/336-0185, 510/254-9700
List price: $99
Reader service no. 701

Introducing UnInstaller™ 3. The newest generation of the No. 1 selling Windows® title in 1994.

The safest and most efficient utility for ridding your PC of all that evil, unwanted stuff that lurks deep inside. And UnInstaller now moves, archives and transports any application.

Look for this cool, new box.

REMEMBER, IT'S A JUNGLE IN THERE.™

Available at your nearest software retailer. For help, call 1-800-775-8645.

MicroHelp

Circle 161 on reader service card

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Sound BLASTER

Introducing the coolest ride south of the Arctic Circle—the new Sound Blaster multimedia kits with quad-speed CD-ROM.

They have everything you need to turn your ordinary PC into a screamin' machine. Like a Sound Blaster™ 16-bit sound card—the PC sound standard. Stereo speakers to die for. Plus today's most blistering software.

Sound Blaster Multimedia Home 4x is a multimedia fanatic's wish list with 24 of the greatest software hits, like Microsoft® Cinemania® '95, Microsoft Encarta™ '95, and Quicken® Deluxe CD-ROM.

Sound Blaster Discovery CD™ 4x takes you on a high-speed adventure with 18 cool software titles including, Strike Commander® and The Grolier Multimedia Encyclopedia™.

Or just upgrade your CD-ROM drive to quad-speed with our OmniCD 4x, which includes 6 awesome titles.

The New Sound Blaster Quad-Speed Multimedia Kits.

With our 4x CD-ROM drive, software loads faster and everything's in sync. And when tomorrow's games hit the ice, your ride will get even wilder.

Of course, these kits give you genuine Sound Blaster compatibility. Plus WaveTable upgradability and easy installation. So fasten yourself to a Sound Blaster 4x multimedia kit at your nearest computer store or call 1-800-998-5227 Ext. 120. And don't forget to lean into the curves.

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Circle 54 on reader service card

Video Conferencing Product Trims Phone Costs

Desktop video conferencing products, hardware-software combos that let your PC act like a video conferencing system, have been slow to catch on. One reason is the hassle and cost of installing an ISDN line, the high-speed digital phone line required by most of these products. Installation can run as high as $200, which adds up quickly because each person in your office who wants a video conferencing system needs an individual line.

Target Technologies' new C-phone Video Communications System changes all that by letting two or more people share an ISDN line. PCs with C-phone can be connected to each other over your existing ethernet LAN. These networked PCs are then connected to a video gateway called a WAN (wide area network) server, which controls the sharing of the ISDN line.

The networked approach to video conferencing has other benefits. While most conferencing systems require two free ISA slots in your PC (one for a video card and another for a communications card), C-phone requires only one slot.

C-phone Video Communications System

Lets PCs share ISDN lines for video conferencing.
Target Technologies, Inc.
800/666-2496, 910/395-6100
List price: $1995 per PC, base WAN server $2495, one video codec $3995
Reader service no. 697

The C-phone card, which handles the video, connects to a desktop module via a serial cable. That module handles the networking and processes the information from a camera/speaker/microphone unit that sits atop your monitor.

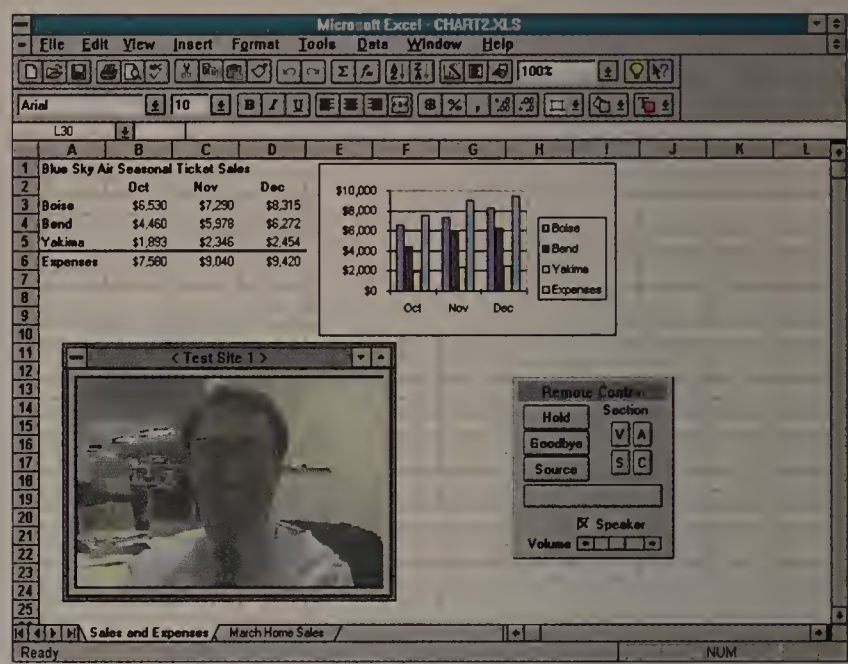
The C-phone software is as easy to use as other video conferencing systems we've tested. As with other systems, you can build a phone book of frequently called numbers and adjust the color and brightness settings of the video windows. Less-common features include the abilities to broadcast video messages to everyone on the LAN and to set up an answering machine capability in which video callers can leave audio messages.

The software has its limitations. C-phone does not include software for sharing applications and PC data, so your conferencing is somewhat limited. You'll need to purchase a third-party sharing application, such as AT&T's Vistium software, to get these capabilities.

The WAN server has 20 ISA slots, allowing you to expand the video conferencing system as your business grows.

The price of the C-phone system becomes more attractive as you add more desktop systems. At about $2000 per desktop and another $6500 for the WAN server and codec, it's not the cheapest option if you want to set up only one or two stations. If, however, you want to get your whole workgroup or business wired for the video revolution, take a look at the C-phone system.

—Dean Andrews



DESKTOP VIDEO CONFERENCING: Target Technologies' C-phone lets you chat with coworkers across a LAN or ISDN connection.

PC Card Pager Displays Messages

Socket Communications' PageCard is one of the first alphanumeric pagers that can be used on its own or plugged into a notebook's PC Card (aka PCMCIA) slot. So if you need complete portability, pop the device in your pocket to receive short paging messages, then read them on the device's two-line scrolling display. To receive longer messages, including E-mail, plug the device into your notebook's PC Card slot and use your screen and keyboard.

The 2.2-ounce pager has 128K of internal SRAM, which stores up to 350 messages. (The unit is powered by a battery that lasts about 30 days, according to the vendor.) The PageCard software, PageSoft, allows callers to leave messages up to 2000 characters long—about 1 page of single-spaced text. The Socket Wireless Messaging Service provides a toll-free number available 7 days a week, 24 hours a day.

When you plug PageCard into your notebook, you can read your messages in Microsoft Mail and Lotus cc:Mail. (They appear in your E-mail in-box.) In Microsoft Mail you can use the PageSoft software to create macrolike agents that scan your mailbox and forward only certain messages, like those from your boss or secretary.

—Arden M. Hoffman

PageCard

This pager works on its own or in a PC Card slot.
Socket Communications
800/552-3300, 510/744-2700
Price: pager $399, monthly service $19.95 to $39.99
Reader service no. 698

THE PREMMIA GX WITH DUAL PROCESSORS. (This power should be used for good, not evil.)

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In fact, some people are amazed at how much the Premmia GX computer performs like a workstation.

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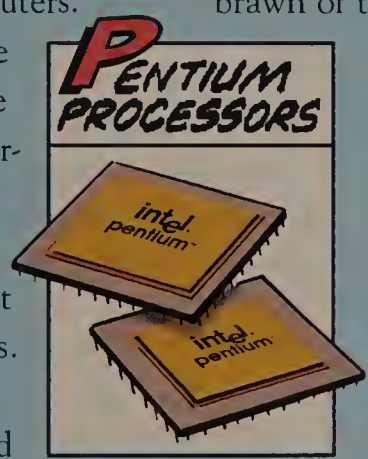

And with an integrated FastSCSI-2 controller, you can quickly connect a hard drive, scanner or whatever peripherals your work demands.

But, of all its features, the real brawn of the Premmia GX may be our network of resellers across the country. Plus, our very own telephone support group is just a call away–24 hours a day. And, of course, there's a three year warranty as well.*

What else would you expect from one of the industry's largest PC makers?

To learn more about the GX, call 1-800-876-4AST. Knowledge is power, too.

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Circle 44 on reader service card

Bring the LAN Along With Fujitsu's Stylistic RF

Fujitsu's Stylistic 500 pen-based desktop-in-the-hand is now the Stylistic RF, featuring a fully integrated wireless LAN adapter. For mobile workers—hospital personnel, power plant workers, and anyone else who needs the combination of desktop-level computing power and short-distance LAN communications—the Stylistic RF may be the ideal companion.

Mobile users can now use the 2.8-pound Stylistic to send and receive data at distances up to 1000 feet (or 500 feet indoors) at rates up to 1.6 megabits per second across 15 independent channels. Incorporating the Proxim RangeLAN2 LAN adapter, the Stylistic RF can access most standard LAN operating systems (including NetWare, NetWare Lite, LAN Manager, and Windows for Workgroups). And its spread-spectrum radio technology is compatible with Proxim's line of RangeLAN adapters.

The Stylistic RF packs a lot of other big things into its small package, including an Intel 486DX2-50 CPU, 4MB of RAM (expandable to 20MB), and a 105MB PC Card hard drive. The product also includes DOS 6.2 and Windows for Pen Computing, so it's easy to take your applications with you (and work on them with a detachable standard PS/2 keyboard). Additional features include an 8-inch-diagonal, backlit VGA screen, floppy drive ports, and a PC Card Type III slot.

All this hardware comes at a price—a sky-high $3500 (though lower if purchased in quantities). Still, for users who need more oomph than most tablets offer, the Stylistic RF may be just the ticket.

—Bronwyn Fryer

WIRELESS LINK TO THE LAN: Fujitsu's Stylistic RF is a pen-based, hand-held computer that uses a radio signal to connect to a network.

Stylistic RF

Fujitsu's hand-held PC now features a built-in wireless LAN adapter.
Fujitsu Personal Systems, Inc.
800/831-3183, 408/982-9500
List price: $3785
Reader service no. 699

Sound, Fax, and Voice Mail On One Card

Multifunction sound boards can boost the communications power of your small or home office without hobbling your budget. Diamond Multimedia Systems' Command Center, one of the newest boards in this category, incorporates 16-bit sound, a fax-modem, a CD-ROM interface, voice mail, and speakerphone capabilities.

The prices are affordable, at an estimated $199 for the Command Center 14.4 (with a 14.4-kbps V.32 bis fax-modem) and $299 for the Command Center 28.8 (with a 28.8-kbps V.34 fax-modem).

Both boards offer 16-bit CD-quality sound, Sound Blaster Pro compatibility, and FM-synthesis MIDI support. A $99 upgrade provides wave-table MIDI support for even more realistic instrumental sounds.

On the communications side, the Diamond Command Center boards will be some of the first products to support Voiceview technology. This means that during one call over a single analog telephone line you can switch between talking and sending data.

The modems also support Caller ID, the telephone service that displays a caller's phone number. If your contact manager application also supports Caller ID, a contact manager record with related information pops up before you take the call. At press time, Diamond was planning to bundle a contact manager.

Rounding out the power of these boards, a voice mail feature lets you set up as many as 1000 mailboxes. Diamond also provides speakerphone capabilities and links to pagers. The Command Center 28.8 card's full-duplex speakerphone capability allows people on both sides of the call to talk at once; on most speakerphone calls, the parties must take turns talking. The Diamond cards also support fax-back and fax-on-demand systems.

A family of similar products from another company, Boca Research, will ship in the spring. These 14.4-kbps boards will likely start at $179. So shop carefully to find the best deals.

—Laurianne McLaughlin

Diamond Command Center 14.4 and Command Center 28.8

Fax-modem plus sound, voice mail, and speakerphone.
Diamond Multimedia Systems
800/468-5846, 408/325-7000
Street price: 14.4 kbps $199, 28.8 kbps $299
Reader service no. 700

RIGHT NOW, THERE ARE HUNDREDS OF VALUE DESKTOPS. BY THE END OF THIS AD, THERE WILL BE ONLY ONE.

LET'S START BY SAYING THAT this is unashamedly an ad for the AST® Bravo MS. And the assumption we're making is that you're currently weighing the implications of moving over to one of the new 32-bit operating systems, like Windows™95.

On the surface of it, there are hundreds of desktops to choose from.

Obviously, they have to be Plug and Play ready to even be in the running. And, of course, they have to be affordable.

Ideally, they'll have at least a 75MHz Pentium™ Processor. And the processor, cache, graphics, system RAM and hard drive will be easily upgradable.

Up to two PCI, five ISA expansion slots, and 7 drive bays are important for enhancement flexibility.

And how about a PCI-based graphics subsystem plus a myriad of advanced power management and security features?

Clearly the Bravo MS has all of this, or we wouldn't be mentioning them.

But there's something else we haven't mentioned: AST NetFlash BIOS. It enables you to update all your Bravo MS desktops from a central location.

AST has it, the others don't. With theirs, you'll have to reconfigure each of the computers on the network individually. And the more you have, the bigger pain it will be.

What more can we say? Except that the Bravo comes in low-profile, mid-size and mini-tower versions. And AST offers 24-hour/7-day telephone support, a 3-year limited warranty* (first year on-site) and comprehensive reseller support in the field.

Talking of resellers, you might want to call us at (800) 876-4AST for the name of the one nearest you.

Bravo MS

100MHz Pentium™ to 486 processors

4MB, 8MB or 16MB RAM, upgradable to 128MB

270MB, 540MB or 1GB Enhanced IDE hard drive

PCI local bus graphics, 1MB graphics RAM upgradable to 2MB for 64-bit access

Up to 7 drive bays and 7 expansion slots (2 PCI, 5 ISA)

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AST® COMPUTER

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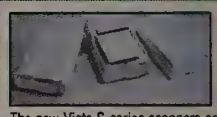

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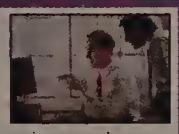

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We have a two-inch-thick employee manual that is also sent to our European offices. Power Translator helped me translate it into the local languages of our branch offices. It even imported the original word processing file, so I didn't have to waste time typing. Now all our employees feel they're part of the team, and I'm a hero!

"C'est facile! I'm learning French faster!"

To improve my French, I found a pen pal on the Internet. Power Translator helped me start trading letters right away. Now Pierre and I exchange e-mail all the time and I'm using the grammar and dictionary modules to advance my skills. Thanks to Power Translator, I'm going to visit Paris next summer!

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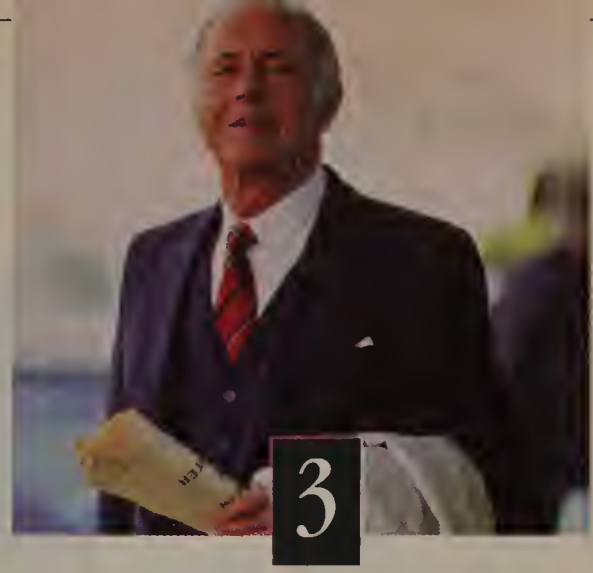

"¡Muy bien! My sales have doubled!"

Since NAFTA went into effect, I've been expanding my business into Mexico. Using Power Translator I've established new distributor relationships in Mexico City. And by customizing the dictionary, I only had to enter specialized business terms once! Although I still use professional translators for contracts and legal documents, Power Translator helps me understand the basic stuff in Spanish right from the start.

"Spitze! We didn't have to settle for the ordinary!"

We wanted something unique for our honeymoon. With Power Translator we sent letters out to small bed and breakfasts on the Rhein. We spent two wonderful weeks at a vineyard along the river. Power Translator made it easy to plan a romantic adventure in Germany!

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Mustek Paragon 1200 Combo

As flatbed scanners move into the mainstream, they are rapidly gaining features and dropping in price. Take the Paragon 1200 Combo, for example. Mustek's latest offering features 24-bit color scanning at 600-by-1200-dpi resolution, hassle-free installation, and OCR and image editing software for an unheard-of $899 street price. The bundled iPhoto Plus image editing package and Wordlinx OCR software will provide many users with all the power they need to manipulate scanned images, and the Paragon's TWAIN compatibility means it will work with practically all major Windows-based graphics applications. In addition, the scanner connects to your PC by using either an Adaptec SCSI interface or the included 8-bit SCSI card. The latter works without IRQ, DMA, or memory settings, making installation a no-brainer. Mustek, 800/468-7835, 714/250-8855.

Reader service no. 677

The Pocket PCRef, 4th Edition

Need to have a modem's AT commands at your fingertips? Or a pinout diagram for standard PC cables and ports? You'll find that technical information and more in *The Pocket PCRef* by Thomas J. Glover and Millie M. Young. Although it's 544 pages, it still fits easily in your pocket. The new fourth edition includes a PC industry phone book with more than 3500 numbers, handy MS-DOS command references through version 6.22, hard disk configuration data for more than 2500 drives, Windows 3.1 keyboard shortcuts, and *Boardwatch* magazine's top 100 BBSs for 1994. *The Pocket PCRef* lists for $14.95. Sequoia Publishing, 800/873-7126, 303/972-4167, 303/972-0158 (fax).

Reader service no. 678

CABLE-FREE FILE TRANSFER: Extended Systems' JetEye uses an infrared signal to transfer data between a notebook and a desktop PC.

JetEye LT for Windows

File synchronization programs are a dime a dozen. But JetEye LT for Windows transfers files through thin air—no bulky cables required. Instead, infrared light transmits data between desktop and portable PCs. Attach a tiny transceiver to each computer's serial port, and the devices establish a connection when they're in range (typically within the same room). A bundled software package, LapLink Synchro Plus, lets you synchronize the contents of the two computers' hard disks. The software can automatically perform the file update on each PC, or you can transfer files manually. The $199 JetEye LT uses an infrared standard backed by the Infrared Data Association, so it will be compatible with future wireless infrared products from major portable PC manufacturers. Extended Systems, 800/235-7576, 208/322-7575.

Reader service no. 679

R:Base 5.0 for Windows

Microrim's popular relational database makes its Windows debut. R:Base 5.0 for Windows gains the ease of use of a graphical user interface, yet remains compatible with earlier versions of R:Base, the vendor claims. Highlights of the new version include support for storing graphics in databases, and a new module called Application Express, which lets you create customized database applications without writing code. R:Base 5.0 for Windows lists for $495, but owners of earlier versions can upgrade for $149. Microrim, 800/628-6990, 206/649-9500.

Reader service no. 680

ComputerEyes/1024

Digital video is changing the way we use computers. Although typically associated with entertainment software, video is increasingly used in business applications such as computer-based training and multimedia presentations. Digital Vision's latest addition to its video frame grabber lineup is a do-it-all device aimed at both home and office users. ComputerEyes/1024 is a video capture board that uses high-speed VRAM to capture single frames or full-motion video at up to 30 frames per second; it can also capture frames at up to 1024-by-768-pixel resolution from any video source (such as a VCR) that outputs an NTSC Composite, RGB, or S-Video signal. Priced at $599, the board supports most popular image file formats and saves video clips in Video for Windows' AVI format. It can also capture images in 24-bit color and save them in any color depth. Digital Vision, 800/346-0090, 617/329-5400.

Reader service no. 681

The Legal Guide for Starting and Running a Small Business

As a small-business owner, you may not have a lawyer in the house, but you can have one in your PC. This legal self-help software, based on the best-selling book by attorney Fred S. Steingold, delivers a wealth of information at a very low price. You'll find legal advice on sole proprietorships, partnerships, corporations, trademarks and service marks, licenses and permits, and taxes. It also provides information on hiring and firing employees and dealing with small-claims court. In addition, the program lets you create bookmarks to

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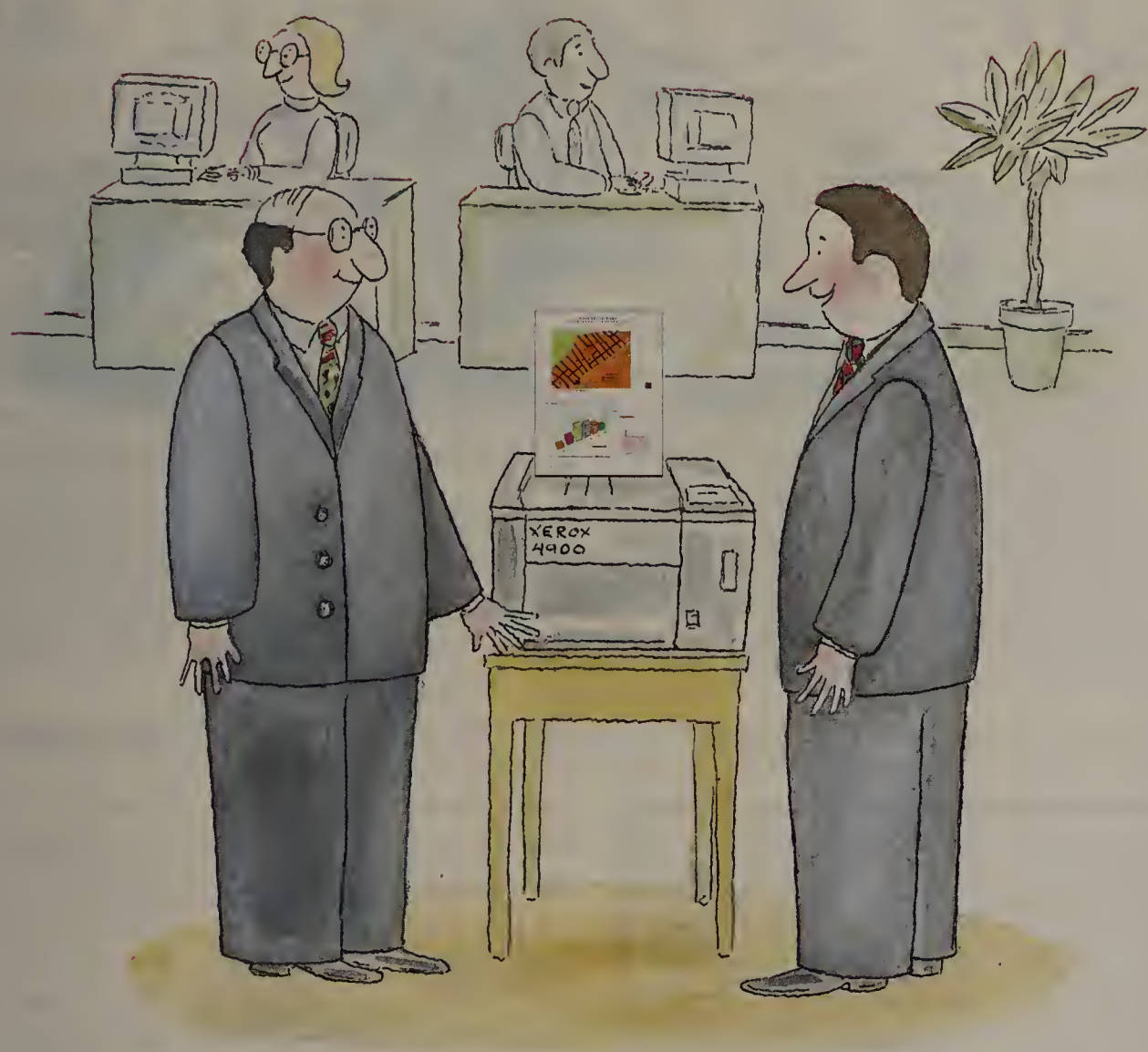

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access useful information easily. Legal Guide lists for $24.95. Nolo Press, 800/992-6656, 510/549-1976.

Reader service no. 682

Printer PowerSaver Plus

When a laser printer sits idle, waiting for incoming print jobs, it wastes electricity. But the Printer PowerSaver Plus can make your printer an energy saver. You connect this accessory to the parallel port on your PC, then plug the printer cable into it. The device powers down the printer after a user-specified period of inactivity. When a print job is sent from the PC, the PowerSaver Plus captures and compresses the data, which frees the PC from having to spool data to the printer. If the printer is in sleep mode, the device activates it and sends the data once the printer has warmed up. The Printer PowerSaver Plus is street priced at $99 to $119. Linksys, 800/546-5797.

Reader service no. 683

The National Directory of Addresses and Telephone Numbers, CD-ROM Edition

As CD-ROM phone books go, The National Directory of Addresses and Telephone Numbers looks small—only 136,000 listings, 112,000 fax numbers, and 15,000 toll-free numbers. But this business-to-business tool contains information you won't find in bigger packages. For example, it includes listings for Internet organizations, Internet access providers, and freenets. It also provides E-mail addresses for selected listings, such as educational institutions and members of Congress. You can search the directory by name, state, city, zip code, or area code, then export the results to other applications. The National Directory sells for $150. Omnigraphics, Inc., 800/234-1340, 313/961-1340, 800/875-1340 (fax).

Reader service no. 684

FlowModel

Arcland's FlowModel not only lets you create flowcharts by simply pointing and clicking on a grid, it also helps you organize supporting data such as statistical tables and worksheets. Designed for complex projects, FlowModel includes nine templates and 100 predrawn shapes (but no freehand drawing tools), and it allows you to link related data, such as cost projections, to any symbol that's in your flowchart. The program can export data in ASCII format for use in spreadsheets and other analysis programs. FlowModel is a 32-bit application optimized for Windows 95. It requires 8MB of RAM and lists for $495. Arcland Inc., 610/993-9904.

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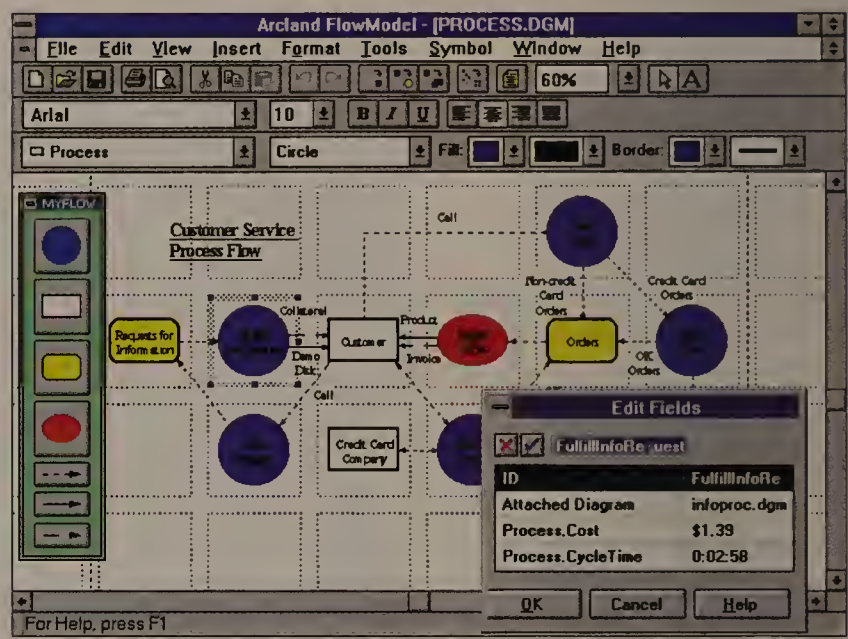

SOPHISTICATED FLOWCHARTING: FlowModel lets you link important business data, such as cost figures, to specific chart shapes.

MediaHouse

You're giving a multimedia presentation tomorrow but can't remember where you saved those wacky sound clips and dazzling graphics charts. Get organized with Ultima Electronics' MediaHouse multimedia file manager, which helps you store and retrieve audio, video, graphics, and other files. The program can organize your multimedia presentation elements using a system of folders and cabinets, and its comprehensive search tools help you find files quickly. For easy viewing of video and graphics files, it displays thumbnail images that you can organize into "photo albums." The $99 MediaHouse supports most popular file formats. Ultima Electronics Corp., 510/659-1580.

Reader service no. 686

Home Phone

Home Phone stands apart from some other CD-ROM–based sets of residential phone listings. You can search the disc's 72 million residential listings by name, then narrow your findings by street, state, zip code, area code, or phone number. But unlike some packages, Home Phone lets you download any or all listings into your favorite database, word processor, spreadsheet, or contact management program. You can save Home Phone's address data as ASCII text or as a DBF file. And the dialing feature lets you dial a number from within the program. The Windows version of Home Phone includes a free copy of Maplinx Lite, a mapping program that geographically displays data points. Home Phone lists for $69. Pro CD, 800/992-3766.

Reader service no. 687

OS/2 Essentials

Looking for an inexpensive OS/2 utilities package with some cool basic tools? Then check out Stardock Systems' new release, OS/2 Essentials. This package includes a screen saver, a Mac-like trash can that deletes its contents only when you tell it to, a comprehensive file manager, a graphical display of the storage space used by each directory on your hard disk, a program launcher and task manager, and a fun new version of the classic game Asteroids. The vendor has bundled all these former shareware products together, selling each for less than the usual registration price. At just $39.95, OS/2 Essentials is a bargain. Stardock Systems, 313/782-2248.

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For more information about any product, contact the manufacturer or circle the number on the reader service card.

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WordPerfect DOS 6.0?
But my 5.1 has more wear left.

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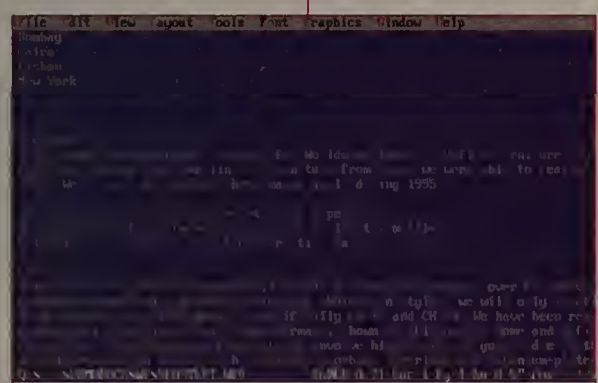
STATUS QUO OR 6.0?

6.0. The familiar look and feel of your trusty 5.1 interface, with a new soul.

In a world that seems bent on change, it's nice to have something that's familiar. Something that's been with you through thick and thin. Maybe that's why WordPerfect® 5.1 for DOS is popular with so many users.

So why give all that up for a new version? Well, the great news is that you don't have to. We've kept the best of what's comfortable and easy to use about WordPerfect 5.1 and added new features that will make you even more productive. Take for instance 6.0's Tables function: Now you can produce impressive spreadsheets without ever having to leave your document. Or 6.0's QuickFinder,™ a tool that searches for files in a flash—even when you don't know the file name.

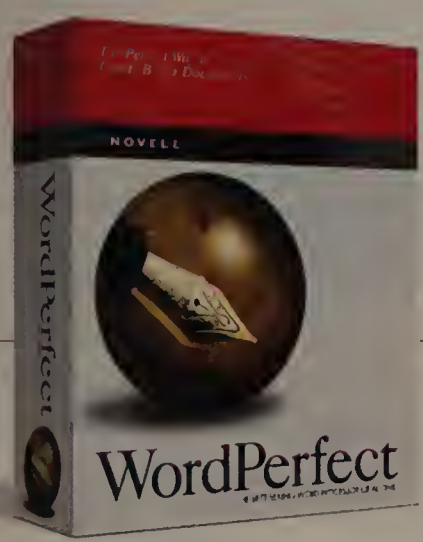


The skills you learned using 5.1 will be just as valuable in 6.0. Coaches™ can even help you improve those skills by teaching you better ways to use WordPerfect.

There's even an option to switch from your familiar DOS character-based mode to a true graphical interface. That way, you can see what your printed page will look like and edit it right on screen.

Of course, we've kept the most popular features of WordPerfect, like Reveal Codes, Print Preview, and Merge—features that seem second-nature to 5.1 users. And like 5.1, it even performs well on a 386.

So why switch to WordPerfect 6.0 for DOS? Put simply, it's just as comfortable and familiar as your 5.1, with great new features you'll enjoy using for years to come. And at only $99, upgrading to 6.0 makes perfect sense. Call us at **(800) 526-2291** to order now, or pick up your copy of WordPerfect 6.0 for DOS at your local reseller. We think you'll find it fills the shoes of your 5.1 quite nicely.



WordPerfect®

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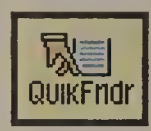
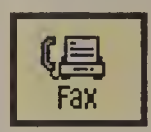
WHAT'S NEW?

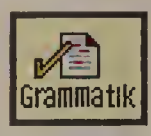
Tables—Create your own spreadsheet, or import one without ever having to leave your WordPerfect document.



QuickFinder—Need to find a file fast? Just type in a word or a phrase, and 6.0 finds any file containing that reference.



Fax—Save time by sending and receiving faxes directly to and from your word processor.



Grammatik®—Is it "who" or "whom"? Grammatik lets you know and also checks your spelling, grammar, punctuation, and style.

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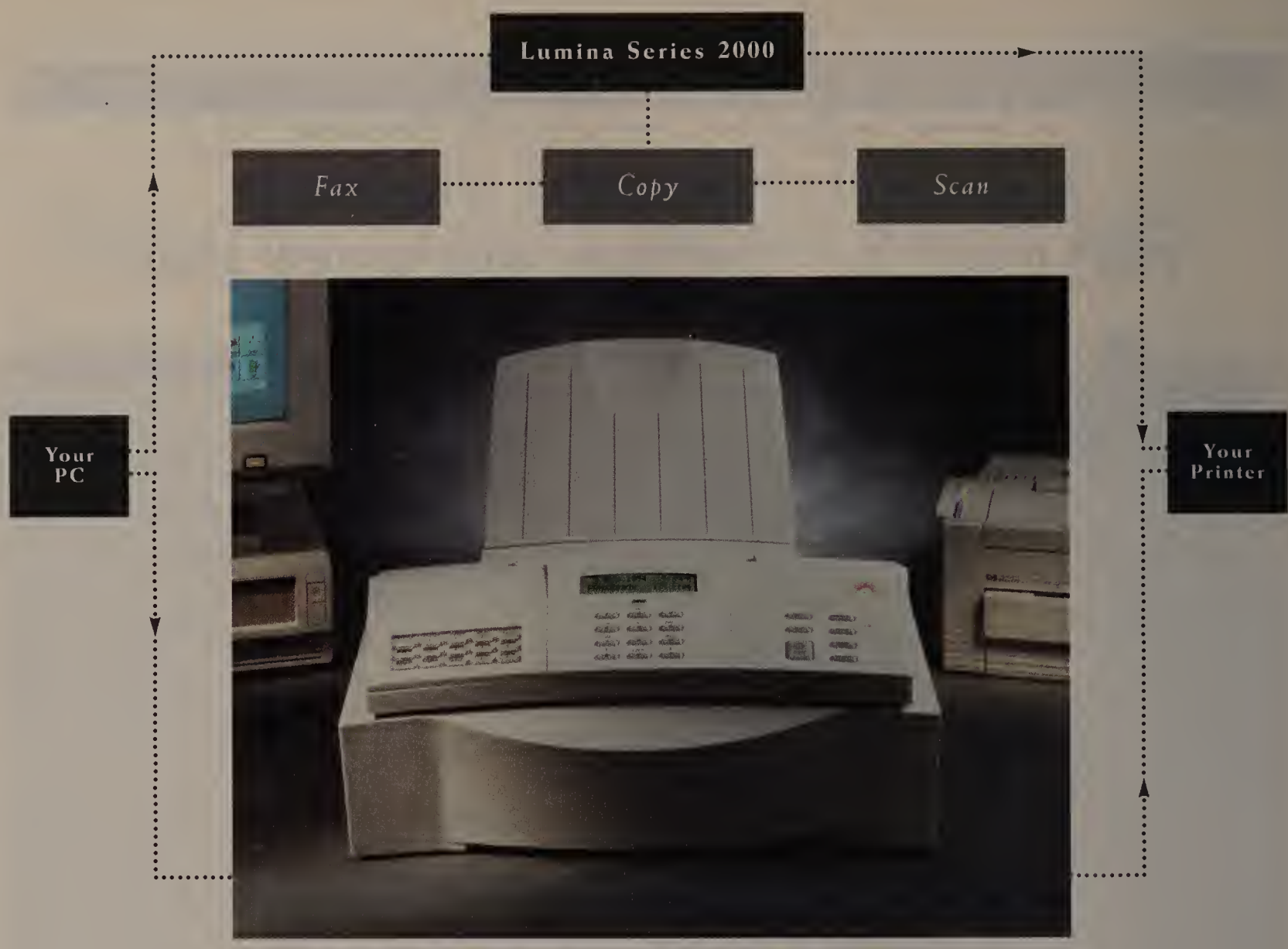

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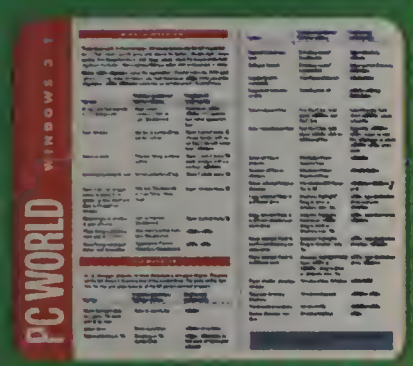

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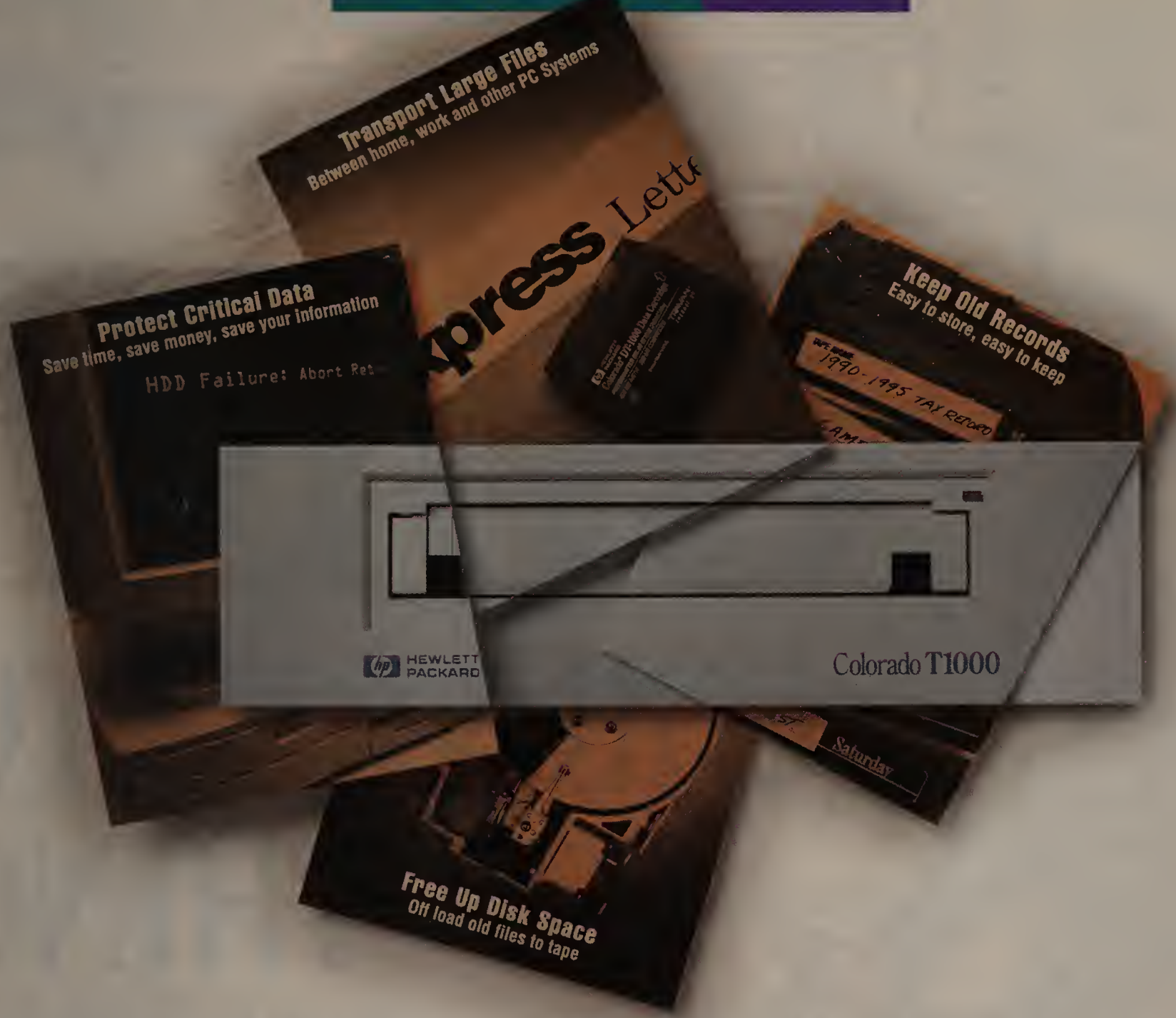

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SOFT FOR NEXT TO NOTHING

By Steve Bass and Scott Dunn

WARE

Twenty bucks will get you five double cheeseburgers, a tank of gas, or some downright **useful software.** Here's a **guide to the best**—online and elsewhere.

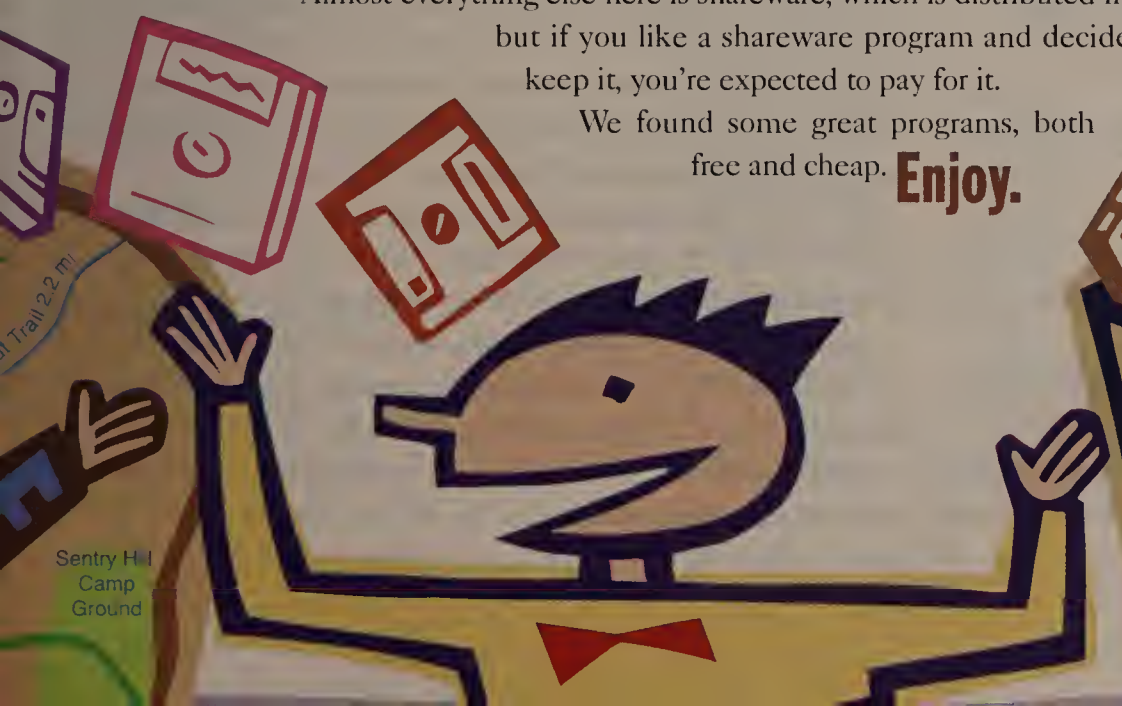
How does the old song go? "The best things in life are free." Of course, so are some of the worst. So we scoured cyberspace to find the cream of the code—the best low-cost and no-cost utilities, miniapps, and information files. We wanted to find great software for $20 or less—preferably *$20* less. And we succeeded. Of the 30 products we recommend, 12 are, quite literally, priceless.

Almost none of this software is sold in stores, so we've gone out of our way to make it easily available to you, online and on floppies. Check out "Where to Find These Programs" for all the details.

Why would anyone give a program away? Most freeware authors are promoting something they charge for—other software, a more powerful version, a service. Many freeware programs listed here are "sample" versions, but they all proved useful and complete in and of themselves.

Almost everything else here is shareware, which is distributed freely, but if you like a shareware program and decide to keep it, you're expected to pay for it.

We found some great programs, both free and cheap. **Enjoy.**



Application Enhancements

Judy's TenKey 3.0

Need a high-power calculator but can't afford the hardware? Don't sweat it; if your computer runs Windows, Judy's TenKey will solve your problem. This elegantly designed program can act like a regular calculator, a scientific calculator, or an adding machine (an important distinction if you've had difficulty switching from one to the other). Like an adding machine, Judy's TenKey keeps a "tape"—a visible record of your transactions—which you can save to a file and open later if needed. Moreover, Judy's TenKey performs scientific, financial, and statistical functions that Windows' own calculator can only dream of. What's more, Judy's TenKey is outfitted with plenty of display options to minimize screen clutter and suit your work style. Registration fee is $19.95. The program is available from the Public Software Library, 800/242-4775, 713/524-6398 (fax), or online. File name: **10key.zip**. —*S. D.*

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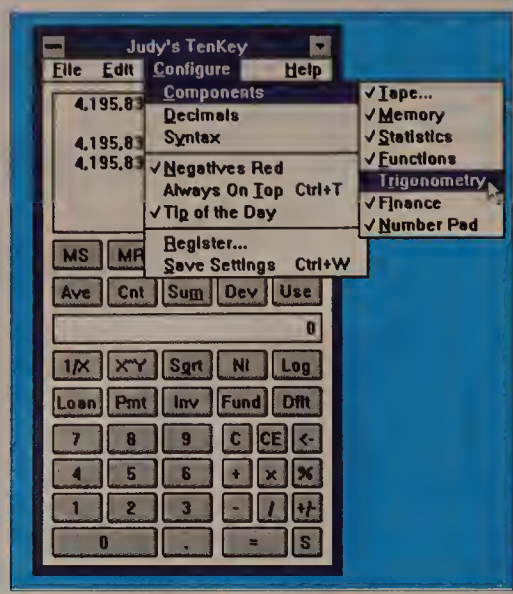

JUDY'S TENKEY CALCULATOR allows you to display or hide the buttons for only those functions that you need.

Spell Check 3.1b

Is your word processor the only application in which you misspell words? Probably not. Consider, then, Spell Check 3.1b, an inexpensive program designed to work with America Online, WinCIM, Prodigy for Windows, Microsoft Mail (the Windows for Workgroups Edition), Windows' own Notepad and Write, and various other Windows applications that lack a spelling checker of their own. Spell Check has a custom dictionary, it can ignore words in all caps or with numbers, and it will even add your name and E-mail address automatically to the end of a file. Because Spell Check works with Windows' Clipboard, you can use it with almost any program—just copy your text to the Clipboard, spell-check it, and paste it back where you got it. The registration fee is $12 ($15 for a disk). Next Generation Software, NextGenSft (America Online), 72154,1174 (CompuServe). File name: **wcspell3.zip**. —*S. D.*

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Business Information

Fill-in-the-Blank Correspondence

You can find prefab letters online for most occasions, but Joe Simon has simplified the search by assembling more than 100 such documents in a single collection. This free set of text files focuses on everyday legal notices and letters, from affidavits to zoning variance applications, sales contracts, employment agreements, and more (the major omissions are wills and health care forms). You can drop any of these ASCII files into your word processor and customize them to suit your needs. Only an attorney can tell you if the result will be legally binding, but you might shave a few expensive hours from your lawyer's bill. File name: **legal.zip**. —*S. D.*

Where to Find These Programs

You can't simply walk into a store and buy most of the products described in this article. However, *PC World* has placed them where you can easily find them—whether or not you have a modem. (The two exceptions, both Editors' Favorites, are Shortcut Software's Shortcut Guides and Coriolis Group's Free $tuff books, which are available only through retail chains.)

- **CompuServe: Type go pwoforum, and browse the *Software Library* for *Featured This Month*.**
- **America Online: Use the keyword pc world, click the *Software Library* button, and select *Files Featured in PC World Magazine* • *Featured This Month*. The files are also available in the *Current Issue of PC World* section.**
- **Other, with modem: *PC World* has placed these programs on a bulletin board that you can access for the cost of a call to San Francisco. Dial 415/974-7303 on your modem, with your communications software set to 8 bits, 1 stop bit, no parity. Look for the *Software For Next To Nothing* menu.**
- **Other, without a modem: If you want shareware mailed to you on a floppy, call Computer Bug at 800/365-7638. It charges $3 per floppy and carries all the programs discussed in this article.**

Remember, just because you pay someone to send you a shareware program doesn't mean you've bought it. You're still expected to pay the registration fee if you decide to keep the program.

There are plenty of interesting places online to discover freeware and shareware. The forums to explore on CompuServe are PWOForum, WinShare, MSWord, IBMNet, MSWin, and Wugnet. On AOL, try either *PC World*'s own forum (keyword: pc world) or Computing and Software (keyword: computing).

Government Freebies

As this article proves, there *are* some tasty free lunches out there. For instance, the government gives away tons of goods and services—not just pamphlets and newsletters but tours of facilities; biking and hiking maps; boating lessons; access to databases; firewood; slides; films; calendars; Christmas trees; even horses. (And you thought that your tax dollars were being wasted.) This no-charge text file explains the whole process for you. File name: **govtfree.zip**. —*S. D.*

Editors' Favorites: Free $tuff on...

There's more free software out there than I can cope with. That's why the *Free $tuff* books from Coriolis Group are so useful. *Free $tuff From America Online* by Luanne O'Loughlin is a well-organized guide to free and low-fee downloads on this rapidly expanding service. The sections on business and utility software alone are worth the book's $19.99 cover price. Even more useful is Patrick Vincent's *Free $tuff on the Internet*, also $19.99. A treasure trove of freebies awaits in the nooks and crannies of the Net. Unlike America Online, the Internet offers absolutely no assistance, so this book is all the more useful as it leads you to the exact address of each file worth downloading. Coriolis Group Books, 800/410-0192 —*Michael S. Lasky, Associate Editor*

Reader service no. 721

How to Write a Business Plan

Starting a new business is a daunting endeavor. This free text file from the American Institute of Small Business helps you take the first steps. Besides explaining why you need a business plan, How to Write gives you a sample plan and an extensive questionnaire to get you thinking about the details of your new enterprise. File name: **bus_plan.txt**. —*S. D.*

PR Kit

Almost every business needs media exposure, but small companies can't always afford a public relations firm. PR Kit provides shareware text files (in both ASCII and Windows Write formats) that explain the basics of promoting your business and advise you how to proceed. In addition, PR Kit gives you a handful of sample press releases that suggest strategies and provide useful models. When you pay the $15 registration fee, you'll receive additional information on public relations and advertising. Gray Run Technologies, GPlummer (America Online), or 71604,2522 (CompuServe). File name: **prkit.zip**. —*S. D.*

Reader service no. 720

Rites for Writing Right

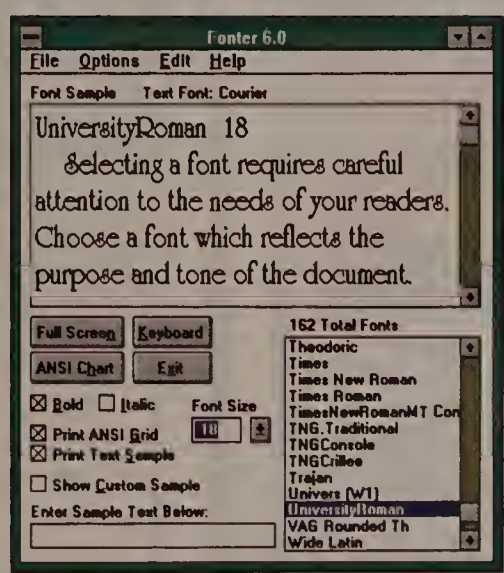
Your English teacher told you good writing is an asset to any career. If you didn't listen then and can't afford night school now, this file could save your ASCII—or any other text you write. James K. Lewis's Rites for Writing (Letters and Everything Else) Right is a complete composition course boiled down to a mere 14K. It covers structure, punctuation, usage, principles of writing readable prose, and hints on buzzwords to avoid. It won't replace your English teacher, but it's a good refresher course and a free one. File name: **write**. —*S. D.*

Communications

Comset

When your internal modem jams, there's not much you can do except turn off your computer. That is, unless you have Comset, a cheap, functional program that does nothing more than give your modem a swift kick in the port—or at least a hardware and software reset. I use Comset from a DOS window, and I wouldn't be without it. Comset costs $10. Hank Volpe, 410/256-5767, 410/256-3631 (BBS). File name: **comst12.exe**. —*S. B.*

Reader service no. 722



PICKING YOUR FONT: Let Fonter give you a quick peek at how your font looks with any text and at any size.

Mosaic

The first World Wide Web browser is still the best in its price range—free. Written by the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign, Mosaic single-handedly popularized the Web, giving birth to a cottage industry of commercial Web browsers. Thanks to the Web and Mosaic, average citizens now have an easy point-and-click interface to the Internet. Get your copy by using ftp to connect to **ftp.ncsa.uiuc.edu**, or look for the file name **mos20a9.exe**. —*S. B.*

PortaCall

Need to know if someone calls your home when you're not there? PortaCall monitors your answering machine and calls you when you've received a message. The program's not glamorous—there are no WAV files to tell you who called—but what do you expect for $15? PortaCall simply dials your pager, or any phone number you give it, signaling that you have received a message. You need to connect your answering machine to your modem, a 10-minute job that's explained in the documentation. Bill Dineen, 76370,2451 (CompuServe). File name: **pcall2.zip**. —*S. B.*

Reader service no. 723

Wincode

Every so often on the Internet you bump into a message that makes no sense—not a political opinion, but a file that has been UUCODEd. UUCODE is just a way to convert a binary file such as a program or graphic into ASCII for E-mail purposes. Of course, once you've downloaded such a file, you need to decode it. If you know how to drag

Editors' Favorites: Dial-It and Dial-It Pro

I keep phone numbers all over the place, from industry contacts in a database on *PC World*'s network to personal numbers in an ASCII file on my hard disk. I wanted a phone dialer that could work with all these sources, and I found it in Dial-It and Dial-It Pro by Louis Collado. I click on a phone number displayed in any Windows program, click Dial-It's phone icon, and my modem calls the number. The software even knows to ignore the listed area code if it's the same as mine. The Pro version gives me a button pad for storing frequently used numbers. That way I don't have to bring up that ASCII file to call my wife's office. Registration fees are $10 for Dial-It, $20 for Dial-It Pro. Louis Collado, 72202,1272 (CompuServe). File names: dialit.zip, dialitpr.zip. —*Lincoln Spector, Associate Editor*

Reader service no. 726

and drop from File Manager, you can use Wincode to convert to and from UUCODE. (That's pretty impressive considering that one of those *U*'s in UUCODE stands for UNIX.) The author, G. H. Silva, is giving the program away, but he appreciates hearing from satisfied users. G. H. Silva, 74640,1647 (CompuServe). File name: **wcode103.zip**. —*S. B.*

Fonts and Desktop Publishing

Fonter 6.0

"More than a little is by much too much," wrote William Shakespeare, undoubtedly referring to font management under Windows. Fortunately, Fonter can help you make sense of large font collections by displaying your fonts, including bold and italic variations. It also shows keyboard layouts in both uppercase and lowercase and provides an ANSI chart (with multiple zoom options) for characters available only via the numeric keypad. Best of all, Fonter prints font sample pages and full font books showing fonts at various sizes and extended ANSI charts. It's all available for a registration fee of $20 from OsoSoft, 805/528-3753 (BBS). File name: **fonter.zip**. Version 7.0 shipped too late for this review. —*S. D.*

Reader service no. 724

PagePlus Intro

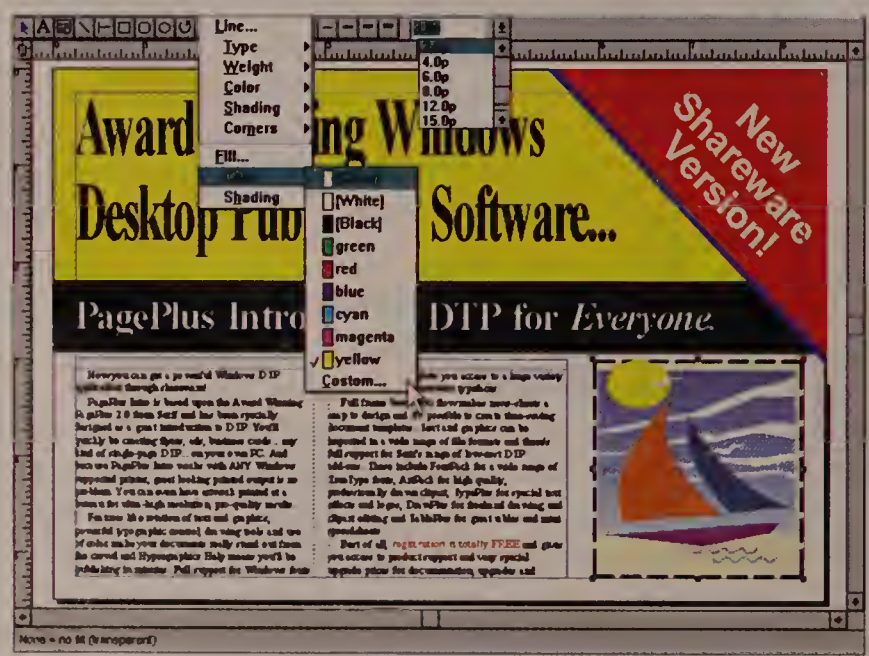
Would you believe a free desktop publisher? Serif is giving away an introductory version of its top-notch $99.95 PagePlus program. To be sure, the free version has some limitations. Unlike the full program, it won't let you create documents longer than one page, use more than 16 colors, or rotate your text in increments smaller than 45 degrees; and there are few import filters and no bundled fonts. But you do get text and graphics frames; tools to draw lines, circles, and ovals; and the ability to wrap text around graphics. You can easily link frames to flow text through your document, and you can import special symbols using Windows' Character Map. All in all, the Intro version is enough to create great-looking ads and flyers. You can use it—for home and personal purposes—for as long as you want. Serif, 800/489-6719, 800/869-8909 (fax). File names: **ppintro1.zip, ppintro2.zip**. —*S. B.*

Reader service no. 725

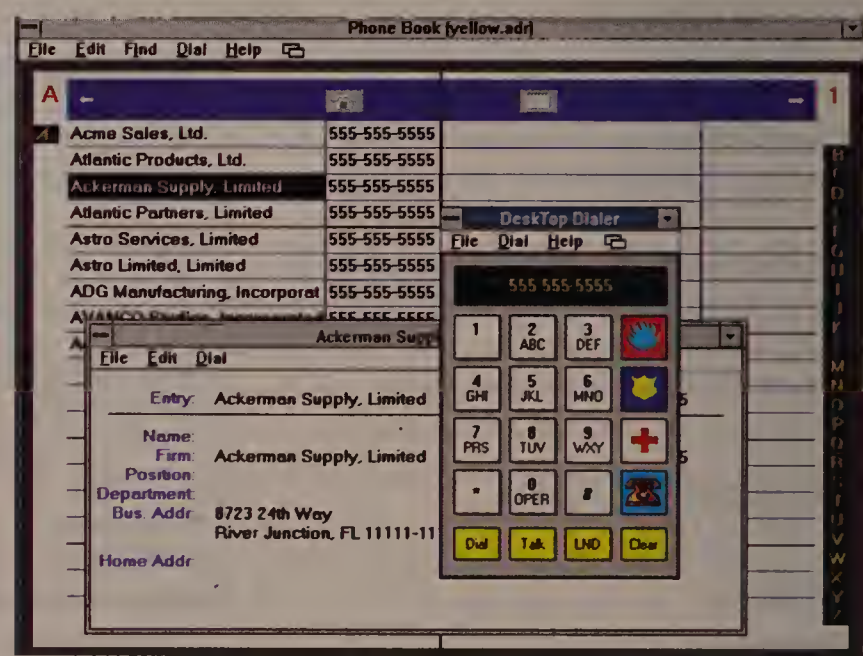
Personal Information Managers

DeskTop Set Jr.

Want a good PIM that doesn't cost much? How about one that's free? DeskTop Set Jr. may not rival Symantec's ACT, but it's good enough for most people, and you can't knock the lack of a price. The phone book, calendar, and dialer modules are separate programs, but they're linked to work together. The dialer has a memory for calls that you've placed, plenty of custom dialing formats (for, say, PBX and pager calls), and an area-code and country-code directory. The phone book stores an amazing array of information, including billing rates and E-mail addresses, and it can send phone



WANT DAZZLING ADS AND FLIERS? Try the no-cost PagePlus Intro desktop publishing program.



PIM FOR FREE: DeskTop Set Jr. has a dialer, a phone book, and a calendar, and it doesn't have a price tag.

Bargains for Big Spenders

Feeling flush? Figure you can afford more than $20 for the software of your dreams? Here are some shareware programs in the $25-to-$50 range that were just too good to leave out.

Elfring Soft Fonts TrueType Font Collection I

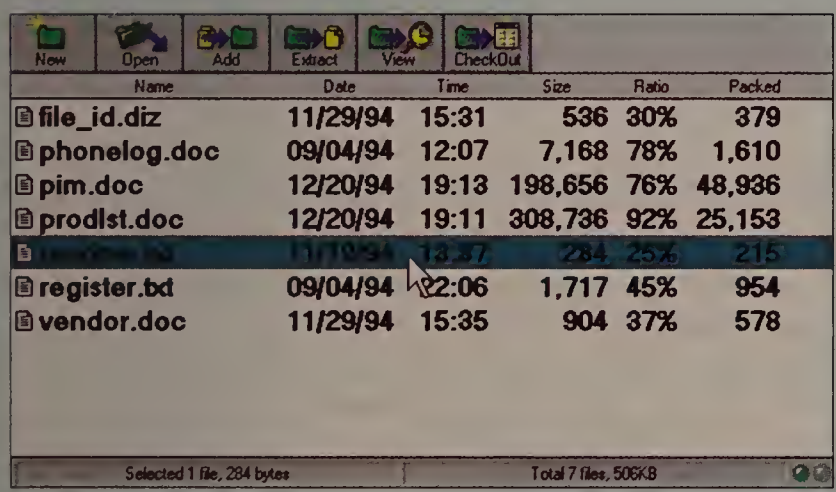
If the TrueType fonts you got with Windows are starting to look old, you can buy an inexpensive face-lift from Elfring Soft Fonts. The Collection I shareware package Includes 10 Imitations of popular text and display fonts, plus Incomplete samples of 10 others. They won't win any awards, but Elfring's fonts are suitable for just about anything short of professional typesetting. One nice touch: The setup program gives you a preview of the fonts before you install them. Pay the $25 registration fee, and Elfring will send you 20 more fonts. Elfring, 708/377-3520, 708/377-6402 (fax). File name: esftt13.zip. —*S. D.*

Reader service no. 737

VirusScan

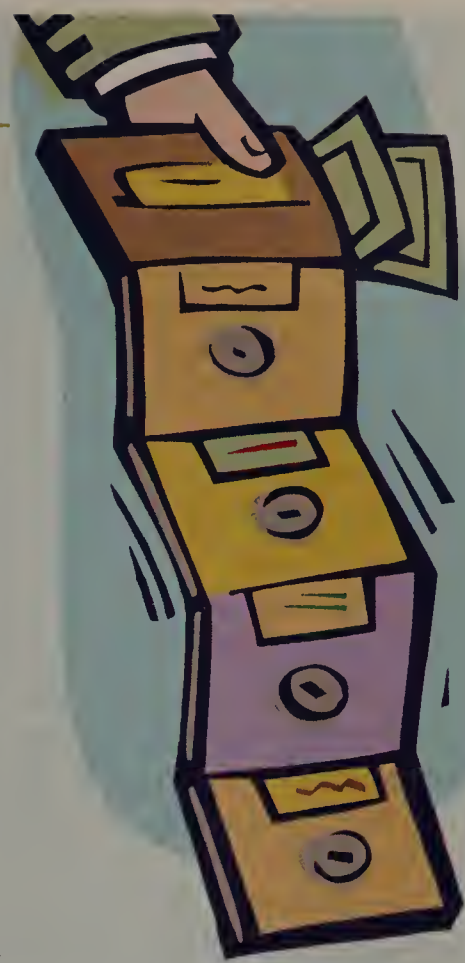
Worried your computer is infected? VirusScan is designed to seek out and eliminate viral infection and has a low price and a solid reputation. While it won't protect against future infections, it can assign validation codes to vulnerable files to help diagnose infection the next time you scan. It works on compressed and uncompressed drives and supports DoubleSpace, Stacker, and SuperStor but not DriveSpace. Registration is $50; $9 more gets the latest version mailed to you. McAfee Associates Inc., 408/988-3832, 408/970-9727 (fax). File name: scn214.zip (DOS), wsc214.zip (Windows). —*S. D.*

Reader service no. 727



NEED TO MANAGE ZIP FILES? Leave it to WinZip to view, copy, delete, and test them.

VuePrint



Here's help for that hard disk cluttered with image and sound files. VuePrint can display, modify, print, and save a variety of graphics formats—including GIF, BMP, DIB, PCX, TGA, and JPG—and play WAV, MID, and MCI sound files. It also offers a lot of tools for manipulating images; it can mirror, rotate, dither, crop, and save files In other formats. You can even view UUCODEd graphics files picked up on the Internet. You can examine multiple files with VuePrint, in slide shows (with more than 12 effects) or in multiple-image contact sheets. Registration is $40. Hamrick Software, EdHamrick@aol.com. File name: vuepri.zip. —*S. B.*

Reader service no. 728

WinZip

If I were stuck on an desert island with a notebook and a CompuServe account, the only utility I'd want would be WinZip. For $29, WinZip lets you archive files by dragging and dropping them from File Manager, and it supports the ZIP, ARJ, LZH, ARC, and Compress formats. You can examine, move, delete, and expand any or all files within the archive. WinZip can even unzip a program and run its setup or install routine, checking for viruses and saving WIN.INI and SYSTEM.INI in the process. If you don't want to keep the once-archived program, WinZip can delete it and restore your INI files to their original state. WinZip has become a permanent fixture in my File Manager. Nico Mak Computing, 70056,241 (CompuServe); also available through the Public Software Library, 800/242-4775, 713/524-6398 (fax). File name: winzip56.exe. —*S. B.*

Reader service no. 738

numbers right to the dialer. DeskTop Set Jr.'s calendar maintains your daily, monthly, and yearly appointments and lets you attach notes and set recurring events. You can use Jr. for as long as you want, but Okna hopes that you will want to buy the $99 grown-up version. Okna Corp.; 800/438-6532, 201/909-8600, 71420,3445 (CompuServe). File name: dtsjr4.zip. —*S. B.*

Reader service no. 729

Timeflys

With Timeflys, you need never forget national holidays, other annual occasions such as Halloween and Saint Patrick's Day, or the right date to set your clock ahead for daylight saving time. Once you've put this free program into your AUTOEXEC.BAT file (don't worry—it's not a TSR and therefore doesn't waste precious RAM), it will send you reminders 11 days, 4 days, and the day before an event as well as on the day itself. (There's also a Canadian version with north-of-the-border holidays like Boxing Day, Remembrance Day, Victoria Day, and so on.) For an optional $8, you can get a version that will let you add an unlimited number of personal events. Keith Parkansky, 414/342-3274, 70401,3710 (CompuServe). File name: tfus16.zip. —*S. B.*

Reader service no. 736

Shareware Support: Mom-and-Pop Service

Will a one- or two-person company treat you better or worse than Microsoft or Lotus?

To answer that question, I registered the four shareware programs listed in "Bargains for Big Spenders"—the Elfring TrueType Font Collection, McAfee's VirusScan for Windows, VuePrint, and WinZip—then requested technical assistance. These are the most expensive programs in this article, and users expect better service from a $50 product than from a $20 one. I found that small shareware vendors offer excellent online support but little or no phone support. The larger McAfee Software behaves like a moderate-size commercial software company, offering slow but workable phone support but disappointing online service.

One caveat about the smaller companies: When one person goes on vacation, support may go too. This didn't happen during my testing, but it's possible.

Telephone Support: Only McAfee offers dedicated phone support, and given the mission-critical nature of virus protection, it should. The quality was typical of commercial software vendors, with waits of up to 20 minutes on your dime. Elfring proved willing to answer technical questions when I called the company's order line, although support is not the line's intended purpose. Neither Hamrick Software nor Nico Mak's Computing (makers of VuePrint and WinZip, respectively) offer telephone support at all.

Online Support: All four vendors have Internet E-mail addresses, usually through CompuServe or America Online. You don't need full Internet access to get this kind of support—any commercial online service or E-mail system with an Internet gateway will do the job. Three of the four companies responded quickly to my queries. As I write this, McAfee still hasn't responded.

McAfee was the only company of the four with a forum on either CompuServe or America Online (it has forums on both). A forum allows you to read and respond to other users' questions and receive responses to yours. Nice as it is to have users help users, it can't replace help from the vendors themselves. McAfee responded to only one of our forum questions, and it took six days to do so. By comparison, I've known Microsoft to respond anywhere from the same day to more than a week later.

As a rule, I found that shareware vendors are more responsive than commercial companies. They upgrade products frequently and usually include one upgrade with the registration fee. If you've ever had to live with a bug for months before the vendor even acknowledged its existence, you'll appreciate this advantage.

If your problem isn't an emergency and you've got at least an E-mail connection to the Net, the service you get from most shareware vendors should more than suffice—it's far more responsive than most of their retail counterparts provide. Phone support, however, will probably be lacking. On the other hand, support from *large* shareware vendors equals that from commercial companies—slow and unpredictable. *—J. L. Jacobi*

Wordware PIM 4.1 for Word

If you work a lot in WinWord, you can now manage your life there, too. The Wordware PIM for Word becomes part of Word for Windows' toolbar, supplying a Rolodex-type menu with a 14-field business and personal directory. Without leaving WinWord, you can make voice calls with a speed dialer; set an alarm; import dBASE, Access, or Paradox data; and schedule appointments via Windows' Calendar. And Wordware's PIM can act as an address book for WinFax Pro and CompuServe's WinCIM. Registration fee is $15. AMF Shareware Productions, 74250,1700 (CompuServe). File name: **pim.zip**. *—S. B.*

Reader service no. 730

Utilities

BarClock 2.3

Start digging around your favorite online service, and you'll encounter memory monitors, resource monitors, disk monitors, calendars, and clocks. Here's a program that's all these things yet doesn't waste a pixel of screen space. BarClock can display one or all of these vital statistics in the title bar of the active application, where they're always visible yet out of the way. Alarms tell you when you're running low on memory, resources, or disk space and alert you to multiple appointments (recurring or otherwise) with custom sounds and messages. BarClock also includes a pop-up calendar and a timer to track your hourly billing rate and elapsed or remaining time. The $15 registration fee is a small price to pay for this gem. BarClock is the brainchild of Patrick Breen, 800/721-2364, pbreen@world.std.com (Internet), 70312,743 (CompuServe). File name: **barclk.zip**. *—S. D.*

Reader service no. 731

MULTIPLE-CHOICE ASSOCIATIONS: With Detour, you can double-click a file in File Manager and choose which application to load it into.

Detour 1.4

If the only tool you have is a hammer, everything looks like a nail. And if the only tool you have is File

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Circle 47 on reader service card

Manager, you can associate each file extension with only one application. But what if you use BMP files in Paintbrush, Photoshop, and Outside In? Detour lets you associate an extension with multiple applications, popping up a list of options when you double-click a file. This handy bit of freeware requires a bit of hammering around in INI files, but once you have finished, launching documents is a lot more convenient. The only payment author Christopher Bolin asks is your opinion. File name: **detour.zip**. —*S. D.*

Editors' Favorites: Shortcuts

Mousing is fine, but with any large Windows application, keystroke shortcuts can make productivity skyrocket. The easiest way to train your fingers is with Shortcut Guides, a series of handy references that pop up over your application. Shortcut Guides are available for a variety of Windows products, Including WinWord, Lotus Organizer, Excel, Paradox, WordPerfect, Quattro Pro, and Xtree. Simply pop up the program with a hot key and type the shortcut key you need. Shortcut Guides then vanishes from the screen, and you're back at work. No shareware here; you buy the Shortcut Guides in stores, where they sell for $19.95 each. Shortcut Software, 800/521-9414, 310/459-3871, 310/459-5621 (fax). —*Steve Fox, Executive Editor*

Reader service no. 732

WinJade 2.3a

If you like toolbars—those configurable, icon-studded button palettes that seem to come with all of the best new Windows applications—check out WinJade. This floating-palette Program Manager replacement lets you launch applications or documents at the click of an icon. And adding programs to WinJade is a simple matter of dropping files dragged from File Manager. You can specify whether your clicks activate a running application or launch a new copy of it; you can open a document by dragging it from File Manager and dropping it on the appropriate WinJade program icon; and you can restart Windows from a menu command. You can add balloon help (captions that pop up to remind you of a button's function), display or hide the title bar, and scale the buttons to any size between 25 and 200 percent. Author Nick Hall is giving WinJade away, but he'll sell you a version without the annoying opening screen for $10. File name: **wjade2.exe**. —*S. D.*

Reader service no. 733

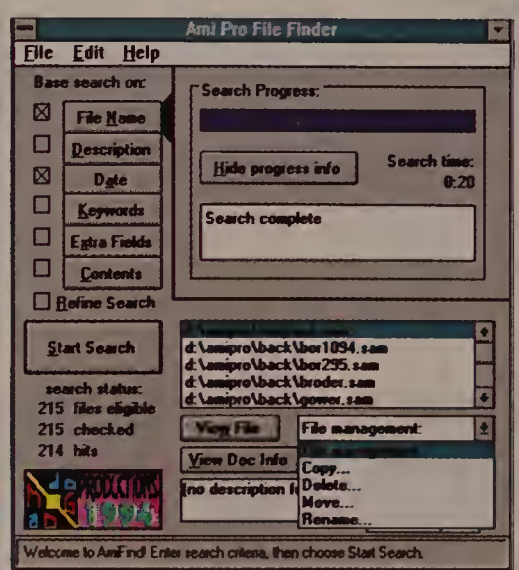
WINJADE OFFERS A FREE AND EASY WAY to launch your favorite applications and documents through a toolbar.

Word Processing Add-Ons

AmiFind

Need a lightning-fast way to find an Ami Pro file created last year that contains, say, the word *Pasadena?* Then I bet you'd want to view it, print it, or maybe even load it into Ami Pro for editing, right? The tool for those jobs is AmiFind, a much-needed search utility that runs from Program Manager or from Ami Pro's File menu. AmiFind searches Ami Pro files by name, description, date, keywords, or contents and even lets you use Boolean (AND, OR, and NOT) logic. It searches in the background while you work, then lets you load, copy, delete, move, rename, or ignore the files that it finds. All this costs you a mere $15 registration fee. Matt Ginzton, 75022,650 (CompuServe). File name: **afnd15.zip**. —*S. B.*

Reader service no. 734



FIND, LOAD, AND VIEW AMI PRO FILES quickly and easily with AmiFind.

TSS Fax

Sending a fax from Word for Windows couldn't be easier, right? Sure, if you enjoy an arduous trip to WinWord's Print Setup, switching the default driver to your fax card, printing, switching back, and—well, you get the idea. You can avoid the driver shuffle completely by using TSS Fax, a free WinWord macro that does all that hard work for you. TSS Fax installs automatically, adding a Send Fax item to your File menu. When you select that item, TSS Fax swiftly changes drivers, loads your fax software, waits while the fax is sent, then changes back to your original driver. The program works with practically any fax software, and it uninstalls easily if you don't like it. Total System Solutions, 718/375-6261 (BBS). File name: **tfax12.zip**. —*S. B.*

View2

Sure you can compare two files in Word for Windows, but with the click of a button, you can have View2 tell WinWord to display them side by side in Normal view and zoom both of the files to 100 percent. This useful set of macros can even open a document in two windows, then let you make changes in only one of them. View2's installation routine does everything for you: It transfers the macro to your Normal template, adds a View2 item to WinWord's Window menu, tacks a View2 button onto your toolbar, and even assigns a shortcut key. And best of all, View2 is free. Michael M. Ross, ross@adpt.co.il (Internet). File name: **view2.exe**. —*S. B.*

ONLINE *The files from this article are available via PC World Online in America Online and CompuServe. Steve Bass and Scott Dunn are contributing editors for* PC World. *Steve Bass is also president of the Pasadena IBM Users Group. Scott Dunn is coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992). J. L. Jacobi is a freelance writer and consultant based in San Francisco.*

For more information about all products in this article, circle reader service no. 907.

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NO-BRAINER BACKUPS

Put your whole hard drive on a single minicartridge? These new backup drives can do it, storing up to 1.4GB per tape. BY RICH SANTALESA

There's nothing like a huge hard drive—whether it comes with a shiny new PC or as an upgrade to a service-scarred system. At last, you have room for all those nifty applications, utilities, fonts, sound bytes, and video clips. But you also have more to lose. In a split second, human error, a power outage, or a software glitch can—and eventually will—wipe out precious data. That leaves you with a humongous backup problem.

Of course, you can always plunge your head into the sand and ignore the backup issue. Then when trouble comes, you'll spend long hours reinstalling apps and retuning. But how will you recover your data? While writing this review, one of our new PCs crashed. When we rebooted, half the files in our Windows directory were gone—along with three months' appointments and deadlines! Happily, we had current backups; 15 minutes later the damage was undone, and we didn't lose a byte of data. We learned long ago to do a full backup weekly and to back up new and changed files daily.

Aside from providing a safe deposit for your data, your backup choice *must* be affordable and provide effortless, automatic usability. Backups won't give you up-to-date protection unless you do them every day.

QIC—Back It All Up

For years, savvy users have turned to backups with QIC-80 tape drives as the affordable answer to the data security dilemma: They required no floppy disk swapping—a single-tape backup left running after hours would protect your whole hard disk's contents. But today's huge hard drives have left the popular QIC-80 drive overmatched. Its top capacity of 250MB per tape falls far short of today's 500MB-plus hard drives.

Fortunately, a new generation of fast, affordable tape drives can back up much more data per tape—for example, 700MB to 850MB on QIC-3010 units, and 1400MB to 1700MB on the new QIC-3020 drives (depending on tape width and file compressibility). Even greater capacities are evolving from an important standards agreement between tape and drive manufacturers (see "Travan: the Shape of Tape to Come").

QIC-3020 drives make a great fit for muscular PC workstations and small workgroups, while

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typical business desktops are nicely accommodated by QIC-3010 units. These drives restore your ticket to convenient single-tape full backups. Furthermore, no-sweat software bundles let you automate and customize to make sure your backups get done—*your* way.

We reviewed nine new tape backup drives, including the first internal QIC-3020 on the market. Four drives are convenient QIC-3010 portables that hook up through the parallel port; four are low-cost, internal QIC-3010 units. We evaluated cost, ease of installation and use, backup speed, and noise level, to identify three Best Buys: The Conner Tape-Stor 850 external, HP's Colorado Jumbo 700 internal, and the Exabyte EXB-1500 internal QIC-3020 drive.

We also looked at products for special archiving and backup needs. The Hewlett-Packard Colorado PowerDAT and Conner Tape-Stor 4000 QIC SCSI tape drives can back up a workgroup or a power desktop workstation. With their whopping 4GB compressed capacities, they'll also serve for archiving large graphics, multimedia, and desktop publishing files. Need random access to huge archives? You'll want something like IBM's removable-media 1.3GB optical drive—or even the Pinnacle Micro RCD 1000 CD-ROM writer (see "Backup and Archive to a Higher Power").

The Price is Right

Internal tape drives cost a lot less than portables. For example, at review time, the least expensive internal, the Colorado Jumbo 700, could be found for about $279 on the street, while the company's parallel port–connected Trakker 700 ran about $469. (At press time, some vendors told us of plans to slash prices, so expect even lower costs than we state on some drives.) Internals can save you big bucks—assuming you have a free 3½-inch externally accessible drive bay and just one PC. But if you need to back up two or more systems, buying a portable can actually save cash because you can back up all your machines with one tape drive. And you can't beat the ease of installation: Just plug it into a power outlet and a parallel port (the drive has a pass-through port for your printer), install your software, and start backing up.

If you're worried about compatibility with tape drives you already have, all the drives we reviewed can read (but not write to) QIC-40/80 media, and the Conner and MicroSolutions drives can also read AccuTrak-250 tapes. Iomega says its drives read AccuTrak backups made with EZTape versions 2.02 through 3.2.

New Sony QIC-Wide tapes, which put a wider tape inside a standard-looking minicartridge, fit only drives designed for them and provide over 20 percent more capacity than do standard QIC media. Of the tape drives reviewed here, only the Conner and MicroSolutions drives—which also accept standard media—use QIC-Wide tapes. However, Iomega units out by the time you read this should also be able to use QIC-Wide tapes and will have different model designations, superseding those reviewed here.

The Key to Fast Backups

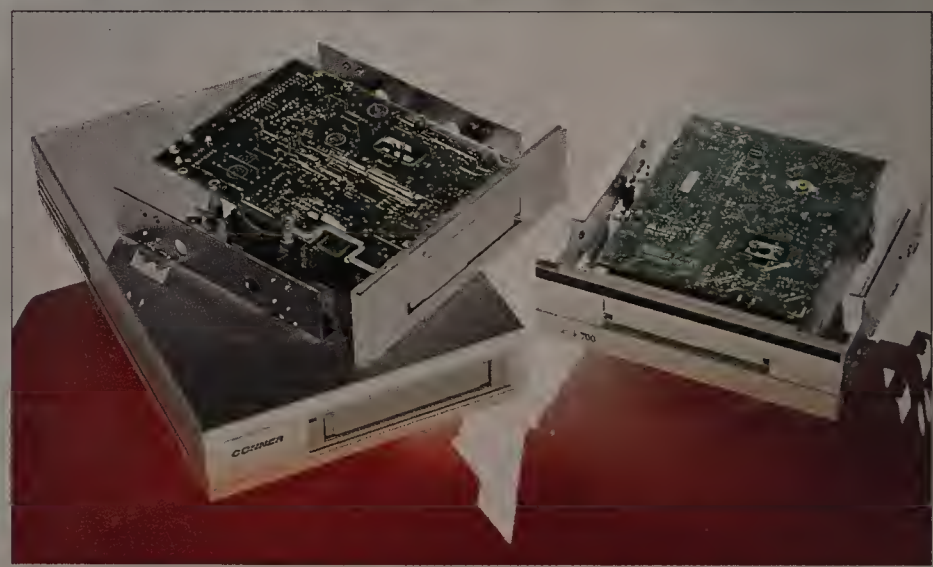
Your floppy drive controller will be able to run internal QIC-3010 and QIC-3020 drives—at a potential cost in performance if your controller can't handle the QIC-3010 drives' 1-megabit-per-second (mbps) top data transfer speed; check with your system vendor. You'll get better performance with a portable drive if your system has an enhanced or bidirectional parallel port.

For a QIC-3020 drive to hit its speed limit, you'll need a high-performance, 2-mbps controller, requiring a free ISA slot (8-bit or 16-bit, depending on the controller) and costing between $50 and $80. According to drive controller manufacturer GSI, you may also need a Pentium-66 or faster to sustain a 2-mbps transfer rate using the data compression in your backup software. If your tape drive vendor can't supply a 1-mbps controller, or if you want to save a few bucks, the $49 GSI Model 21 is a reliable 16-bit, 1-mbps controller that provides support for up to two Enhanced IDE hard drives, four floppy drives up to 2.88MB, and one tape drive. If you want to hook up a hard disk on a VL bus system, you can upgrade the GSI card to a VL bus hard drive controller using an add-on module. At press time, GSI was considering releasing a 2-mbps controller (*GSI, 800/486-7800* **Reader service no. 773**).

Best Buys

One of our Best Buys ran unchallenged in its class: The internal Exabyte EXB-1500 drive (top left) was the first QIC-3020 drive to market. This high-performance, high-capacity drive class is a near-perfect match for today's muscular power desktops. The EXB-1500 ($408 with accelerator card) is a rock-solid implementation, nearly twice as fast as the second-fastest unit—and it boasted fully twice the capacity of most of the drives we reviewed, packing in about 1400MB of data per tape using compression.

It was a photo finish for the Best Buys among the 700MB (with compression) QIC-3010 products. The Colorado Jumbo 700 internal model (right) emerged as our economy king, pairing an almost flawless installation procedure with an unbeatable $279 price. Conner's $469 Tape-Stor 850 external model—the Best Buy portable tape drive—combines a trim, well-designed package and a pleasantly quiet drive mechanism. Because of QIC-Wide compatibility, its capacity per tape gets a nice boost to about 850MB using compression.



When you have 340MB of data to back up, as we did in our full backup test, speed counts. We set up the drives as they're likely to be used, testing QIC-3010s hooked up to the floppy controller and the QIC-3020 drive connected to its optional 2-mbps controller. We tested with a mixture of full backups, incremental and differential modified-file backups, and a restore.

All the drives are reasonably fast. Even the slowest one—the Best Buy Conner Tape-Stor 850 external—still backed up 340MB in less than 50 minutes. Another Best Buy, the new Exabyte EXB-1500 QIC-3020, completed the full backup in less than half that time. Using a Pentium-90, we found the main performance difference between the QIC-3010 portables and internals is the latter group's much faster restores. Of these units, the Iomega Ditto700 external posted the fastest full backup at about 44 minutes. We didn't include a verify pass; if you do, it will roughly double your backup time. If you don't verify every backup, make sure you at least verify the first few to make sure your installation is reliable. We used the bundled Windows software in our tests but suggest also installing the DOS version in case you must restore a corrupted Windows.

The software bundled with these drives is consistently good (important because popular third-party backup packages, such as Symantec's Norton Backup and Central Point Backup, don't support these new formats). Except for the Colorado products, all the drives include the same basic Backup Exec from Arcada, the company that developed Symantec's Norton Backup. Despite slight differences in customization, all have the comfortable Norton look and feel, with push-button ease of use, detailed scheduling, and strong selection power. The Colorado drives include full versions of Colorado Backup: The Windows interface features drag-and-drop ease of use, and any scheduled event becomes a macro you can transform into a double-clickable desktop icon.

In this review, we found you can now have your cake and eat it too, with tape drives that have the capacity to efficiently handle today's big hard disks. And they cost little more than a 250MB drive did a couple years ago.

Rich Santalesa is the former editor in chief of Windows User *magazine. In a previous life, he was also the technical editor of* Computer Shopper. *Rex Farrance is an associate editor for* PC World.

For more information on all products in this article, circle reader service number 908.

IF YOU HAVE A 1-INCH-HIGH drive bay, you'll need to fit it with a 1-inch-high drive, such as the Iomega unit shown. For the Best Buy Exabyte EXB-1500, you'll need a half-height 5¼-inch bay.

Colorado Jumbo 700

PROS: Least expensive drive reviewed, good performance

CONS: Won't fit 1-inch-high drive bay, no toll-free tech support

The Best Buy Colorado Jumbo 700 should be just what Hewlett-Packard needs to keep its top status in the affordable-backup market. At just $279 on the street at review time, this unit is the QIC-3010 low-price leader. As with similar drives, we tested using the floppy controller of our test system. Because of its quicker restores, the Jumbo 700 maintained a slight edge in overall performance compared with the best of its QIC-3010 peers. If you have an older PC, and you want to squeeze more from the Jumbo 700, consider Colorado's optional $70 accelerator card. Its installation is nearly as effortless as the drive's: Hewlett-Packard even throws in power cables and extenders that fit only the right way.

A potential shortcoming is that unlike the svelte QIC-3010 Conner, Iomega, and Rexon internals, the Jumbo 700 doesn't fit in a 1-inch-high drive bay. This is a minor complaint, unless you lack a half-height externally accessible bay. While the Jumbo 700 can't match the Conner drives in quietness, its modest, high-pitched whir didn't bother our office mates. You get an informative diagnostic guide, clear documentation, and a solid software bundle. When you toss in the ultrareasonable price and a two-year warranty, you come up with a fantastic deal and a clear Best Buy. *Hewlett-Packard, 800/845-7905, 970/635-1500* **Reader service no. 774**

Colorado Trakker 700

PROS: Reasonable price, easy installation

CONS: Bulky dimensions, no on/off switch or LED, no toll-free tech support

Colorado's Trakker 700 has the same attractive external casing as the popular Trakker 250 and 350 models. Because of a fairly high-rise profile, it's not a good candidate to share your briefcase with a notebook PC, and its big power adapter weighs close to 2 pounds.

IF YOU TAKE YOUR PORTABLE TAPE BACKUP DRIVE ON THE ROAD, you'll appreciate the Best Buy Conner 850's low-rise case and integrated power adapter (left). The Colorado Trakker is taller, fits less easily in a carrying case, and uses a hefty separate adapter.

Like its Jumbo 700 sibling, the smooth-running Trakker 700 is not overly noisy, and it carries a two-year warranty. Even better, at $469 on the street at the time of review, it is among the least expensive of all the external models. Installation is unbelievably easy, and the Colorado Backup software is a no-brainer to use. Although it can't match the quietness and QIC-Wide capabilities of the Best Buy Conner Tape-Stor 850 external, the Trakker 700 is still a very sturdy, reliable backup solution. *Hewlett-Packard, 800/845-7905, 303/669-6500* **Reader service no. 775**

Travan: The Shape of Tape to Come

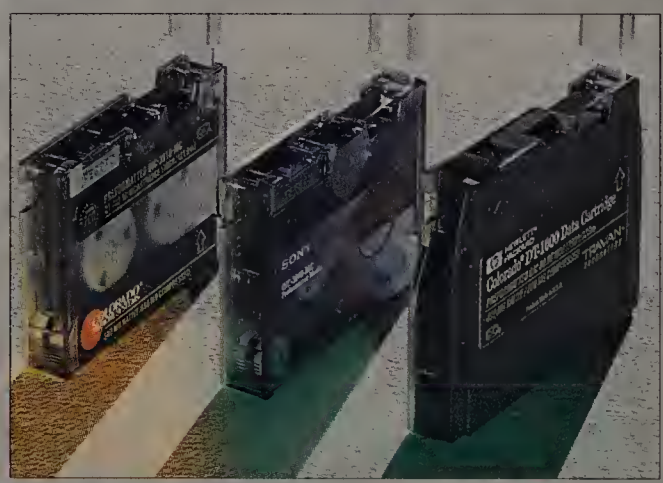
Even today, only about 7 to 10 percent of PCs have tape drives—which means that throngs of otherwise careful people (who insure their homes, cars, lives, and health) are courting disaster by not insuring against data loss. Backup choices now involve a confusing array of tape formats and drive types. Furthermore, vendors typically advertise the *compressed* capacities of their backup drives and tapes—making it difficult for customers to match the size of their hard drives, which are always specified in native or uncompressed capacity.

What to do? Hewlett-Packard and 3M have put their collective heads together and come up with Travan, the beginning of a new trademarked technology. Travan involves a redesign of the basic, quarter-inch QIC minicartridge. Enlarging the tape cartridge just slightly makes it possible for the new drives to retain compatibility with current QIC tapes while approximately doubling tape length. Tapes will also match QIC-Wide widths. Travan drives in the current 120MB (uncompressed) QIC-80 class will hold 400MB (800MB compressed). QIC-3010 drives will go from the current 340MB to 800MB, and QIC-3020 drives will jump from 680MB to 1600MB.

Product families will accept standard QIC siblings: A 400MB drive, for example, will still read and write on a 120MB tape. And all Travan companies will state capacities in terms of uncompressed data (of course you can still use compression). Companies that want to can also design drives to be compatible with QIC-Wide media.

Will this notion take off? We're betting on it. At press time, 3M, Hewlett-Packard, Conner, Iomega, Sony, and Rexon had signed on. The idea is to make an industrywide, compatible standard everyone can understand. Then buyers can make their choices based on price, design, quality, and service.

You may be able to buy Travan products sooner than you think. Hewlett-Packard, for example, plans to release a 400MB Colorado Travan tape drive before the end of June with higher-capacity drives showing up this fall. Keep an eye on *PC World;* we'll give you an early look at the first Travan drive.



The Travan cartridge's extra-length tape (right) holds over twice Sony's QIC-Wide media (center) and more than triples the capacity of standard-width tapes (left).

The 400MB, 800MB, and 1600MB capacities should match popular hard drive sizes while retaining affordable prices. But HP Travan expert Richard O'Connell says there is plenty of room for future capacity leaps. The first three drive families will use the same floppy interface as current QIC-80, QIC-3010, and QIC-3020 units. Larger capacities will require a more robust interface—probably Enhanced IDE, SCSI, or both.

—Rex Farrance

Conner Tape-Stor 850 (internal)

PROS: Handles QIC-Wide tapes, whisper-quiet

CONS: Middling performance

Conner is carrying forward the heritage of the Archive and Maynard drives it acquired when it bought Archive in an outstanding new Conner-branded line of products. And now software from Arcada—a largely Conner-owned company—is appearing with Conner drives as well as with competing OEM bundles. The $299 Tape-Stor 850 shows the excellence of design of all new Conner drives. Its noise level is low; you'll be pressed to find a quieter drive. And the 1-inch-high internal unit has the advantage of accepting either standard 340MB (uncompressed) QIC-3010 cartridges or the larger 425MB (uncompressed) QIC-Wide tapes. The latter cost about the same as standard minicartridges and improve estimated compressed capacity from about 700MB to 850MB.

We got decent performance, although the approximately 50-minute full backup time lagged about 6 minutes behind the fastest QIC-3010 drive, the Iomega external. If you want the best performance with an older system, Conner sells an optional 1-mbps interface for $79. Installation of the drive and card wasn't much of a problem, but inexperienced users may be daunted by the somewhat vague installation instructions that come with the optional interface. As with other Conner tape products, you get a two-year warranty. Despite its somewhat slower performance, this is an excellent drive. Indeed, the Tape-Stor 850 came within a hair of being a Best Buy QIC-3010 internal. *Conner Tape Products Group, 800/626-6637* **Reader service no. 776**

Conner Tape-Stor 850 (external)

PROS: Good design, handles QIC-Wide tapes, whisper-quiet, compact, easy installation

CONS: So-so performance, no power-on indicator

Of the four external drives reviewed here, the Best Buy Conner Tape-Stor 850 is the best overall value. Its design excellence is immediately apparent, and the drive mechanism is remarkably quiet. Furthermore, the $469 Tape-Stor 850 accepts QIC-Wide cartridges as well as standard QIC-3010 tapes. The unit powers down when not in use and comes with a neat, integrated power adapter. So when you're ready

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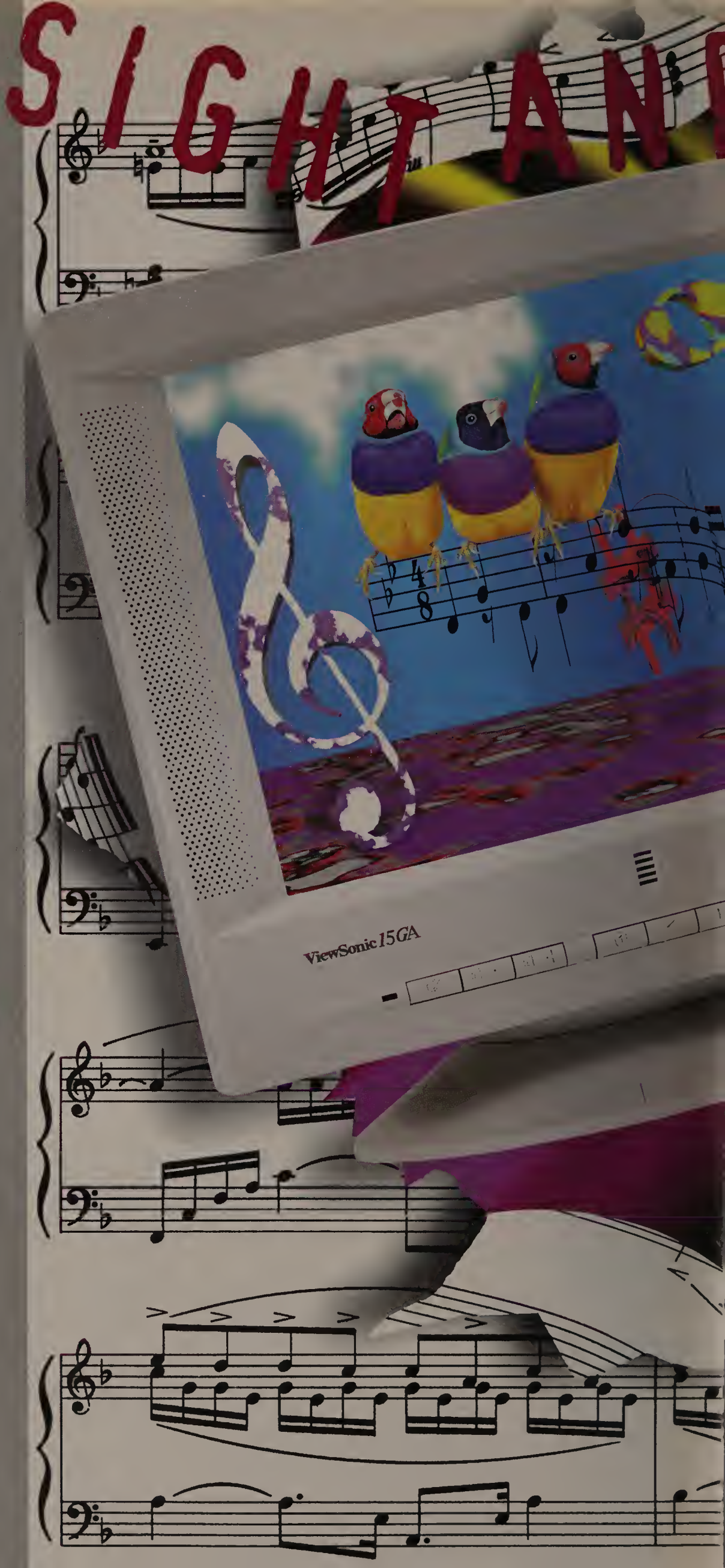

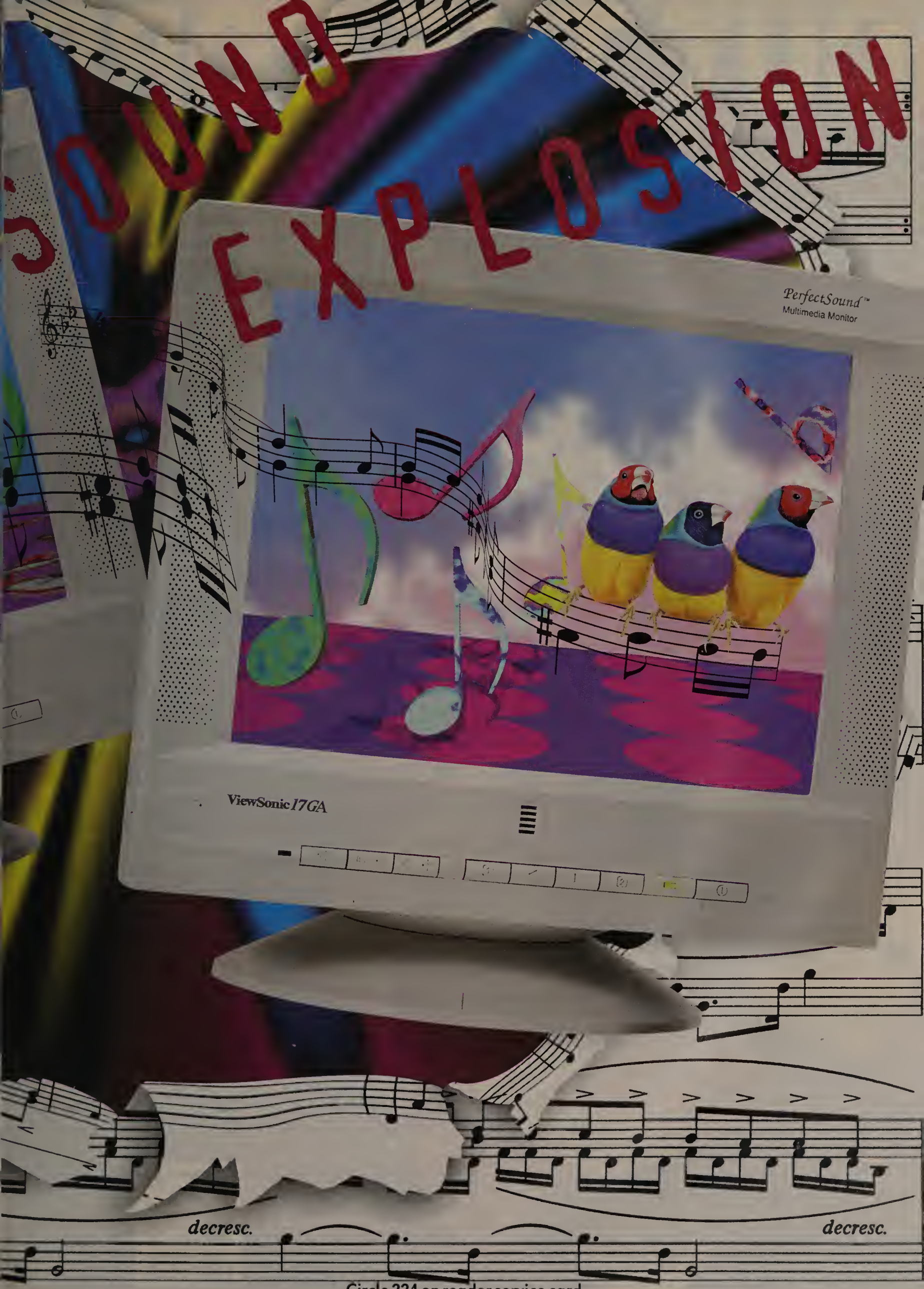

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to hit the road, all you have to pack with the drive and tapes is the slim standard power cord. The documentation is solid, although not quite as good as Hewlett-Packard's comprehensive manuals.

The Tape-Stor's overall performance was marginally the slowest of all the QIC-3010 products, though it almost matched the Trakker 700's speed on the full backup test. Its poorest showing was on the 95MB restore, which took close to 29 minutes—much slower than the Trakker's 20 minutes. Still, its overall performance is acceptable. And its trim size makes it eminently portable.

The Arcada Backup Exec software is excellent, and the unit's design employs a slim and rigid rugged casing. Other than its so-so performance, there's little to criticize in the Tape-Stor. Installation, of course, is a snap. The drive comes with a two-year warranty and has the elements it takes to land a Best Buy: great design, easy portability, a reasonable price, and minimal operating noise. *Conner Tape Products Group, 800/626-6637* **Reader service no. 777**

Exabyte EXB-1500

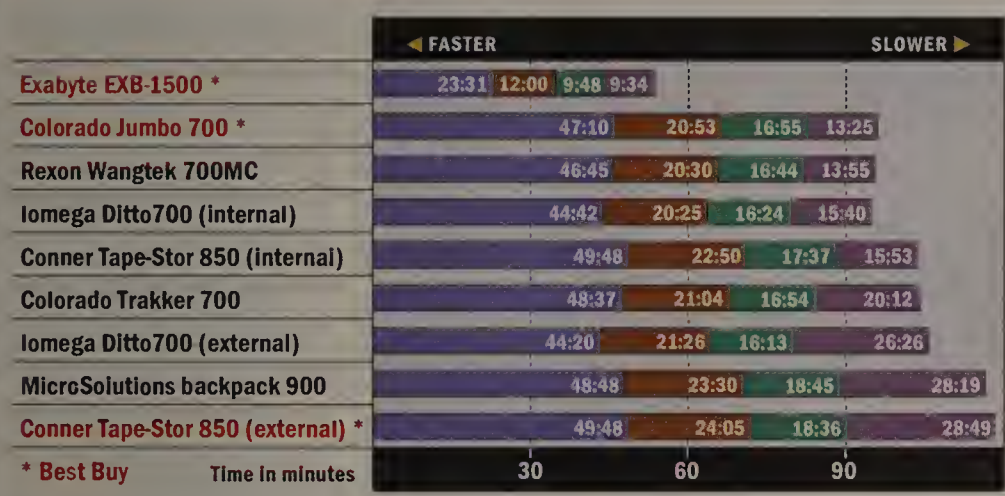
PROS: Fastest drive by far, highest capacity

CONS: Limited settings on accelerator card, won't fit 1-inch-high drive bays

If you have $408 to spend, and aren't intimidated by expansion cards and jumper switches, the Best Buy EXB-1500 has superb performance and doubles a QIC-3010's capacity to about 1400MB compressed—just what you need to back up a hulking Pentium workstation. Using its fine Arcada software, we did a 340MB full backup in less than 23 minutes. The drive costs $329, but for top performance, you'll need a 2-mbps controller (Exabyte's 8-bit card costs $79). The drive worked flawlessly, but the controller's installation pits you against four jumper blocks in selecting your IRQ, port address, and limited array of three DMA channels.

Drive noise is a bit high—a touch louder than that of the Colorado drives. To be fair, the EXB-1500's primary QIC-3020 competitors, from Hewlett-Packard, Conner, and Iomega were too late for testing. So the EXB-1500 will be facing a tussle to retain its high-performance crown. Still, Exabyte deserves credit for being first to market with this Best Buy combination of performance and capacity. *Exabyte, 800/392-2983, 303/442-4333* **Reader service no. 778**

TEST REPORT Exabyte QIC-3020 Doubles QIC-3010 Backup Speed



Tape drives are arranged in order of overall performance, from first to last, based on the normalized, weighted scores from four tests. A drive may have a better overall performance rating than another that took less time to complete our test suite.

Methodology

We tested all drives on a Micron Pentium-90 with 16MB of RAM and a 1080MB Western Digital AC31000 hard drive. The hard drive was divided into three partitions, each of which contained directories, programs, and data files. We sized 660MB and 300MB partitions containing 340MB and 300MB of data, respectively. We ran DOS 6.22, Windows 3.1, and the backup software from the remaining partition.

We used the floppy drive controller on the test system's motherboard, except for the Exabyte EXB-1500, where we used the 2-mbps accelerator card provided by the vendor.

Using the Windows backup program bundled with each tape drive, we executed backups using the highest level of data compression, without enabling verification. We ran the backup with no other applications running in the background. We measured the time from launching a process until the application reported completion.

340MB full backup

On all tape drives, we ran a full backup using the 340MB of files and directories in the 600MB partition and an empty formatted tape.

Incremental backup

Incremental backups select files changed since the last full or incremental backup and then reset the archive bit to indicate that they've been backed up. We selected files for backup from five subdirectories on the 300MB hard drive partition. We backed up a total of 95MB of files in five incremental backups and totalled the times.

Differential backup

Differential backups select files changed since the last full backup. Using the 300MB partition on the hard drive, we added four differential backups of 6MB, 13MB, 18MB, and 24MB to the incremental backup tape and totalled the four differential times.

Restore

We erased five subdirectories from the 300MB partition containing approximately 95MB of files, then restored them using the fastest method the backup software provided.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Iomega Ditto700 internal

PROS: Fine design, construction, and performance

CONS: Occasional noise from head-stepping process

Iomega's generally quiet 1-inch-high tape drives feature easy installations, robust designs, a patented, beltless drive mechanism, and fine Arcada software. The $299 QIC-3010 internal is fast, although part of the good performance comes from its head stepping, which emits an occasional chatter. Ditto850s and a Ditto1700 (all accept QIC-Wide tapes) will replace the current product line by the time you read this. These drives will carry great five-year warranties and, gauging by Iomega's track record, should be superb values. Iomega, *800/777-6654, 801/778-1000* **Reader service no. 779**

Iomega Ditto700 external

PROS: Good design and construction, compact

CONS: Occasional noise from head-stepping process

Iomega's tiny $479 external features great support and performance, a trim power adapter, an integrated data cable, and a handy power switch. It will be replaced by the Ditto850 when you read this—at the same or a better price. *Iomega, 800/777-6654, 801/778-1000* **Reader service no. 780**

Backup and Archive to a Higher Power

Note: You'll need a SCSI adapter to run the devices described in this section, but many of the systems that require these heavy-hitting units will already have one.

Bigger jobs—such as backing up a PC workgroup or PC workstation—demand capacity and performance no QIC-3010/3020 tape drive can provide. The favorite products in this arena are high-capacity SCSI tape drives, such as the Hewlett-Packard Colorado PowerDAT 6000 and the Conner Tape-Stor 4000. Tape is also useful when you need to archive huge files (such as graphics, multimedia, and desktop publishing files). But if you must be able to read files directly from the archival media, you'll need a rewritable optical drive: the IBM Imagestar 1.3GB Half-height Optical Disk Drive, for example. Finally, we evaluated Pinnacle Micro's RCD 1000 Recordable CD drive as an archiving device.

Clockwise from upper left: The Pinnacle RCD 1000 Recordable CD, the Hewlett-Packard Colorado PowerDAT 6000, the Conner TapeStor 4000, and the IBM Imagestar 1.3GB Half-height Optical Disk Drive.

The Bigger Backup

Fast SCSI DDS-1 DAT drives use tapes with a native capacity of 2GB (4GB using compression). The Hewlett-Packard Colorado PowerDAT 6000 is a streamer on the desktop, backing up 340MB in just over 21 minutes. DAT media costs are eminently reasonable: We found a five-pack of tapes for around $60 at a local superstore. Other advantages include a 3½-inch form factor, a fairly low level of running noise, and wide media availability. DAT drives of this capacity are priced from about $800; expect to pay around $1100 for an internal PowerDAT and about $150 to $200 more for an external. *Hewlett-Packard, 800/845-7905, 303/669-6500* Reader service no. 784

A new alternative for DAT-class backups, the QIC-3080 Conner Tape-Stor 4000 is a 3½-inch SCSI tape drive's minicartridges look just like QIC-3010/3020 tapes. But this drive backs up an impressive 2GB (4GB compressed) using QIC-Wide tapes. Hewlett-Packard, Exabyte, Conner, Mountain, Rexon, and others are all major DAT drive sources, but Conner is the only company offering a QIC minicartridge drive of this capacity. Its performance was remarkable, stowing away a 340MB full backup in less than 18 minutes (not using a verify pass).

The list price of a Tape-Stor 4000 is an impressively low $659 for the internal model and $799 for the external; you're likely to find either model for less on the street. Media is pricey compared to DAT: Conner sells QIC-Wide two-packs at $69. The sound level of the Tape-Stor 4000 is reasonably quiet. By the time you read this, Conner will have its $629 Tape-Stor 4000 IDE available—the first Enhanced IDE tape drive. *Conner, 800/626-6637, 714/641-1230* Reader service no. 785

Disk-Based Solutions

Desktop publishing and multimedia files are often so large, it's impractical to restore them from tape to disk every time you need to see them. IBM sent us its 5¼-inch Imagestar 1.3GB Half-height Optical Disk Drive with a 1194MB disk (596MB per side). Per IBM's cautions, we disabled write caching. The archiving speed was fairly slow: Using File Manager to effect the transfer, it took about 100 minutes to copy 500MB of Adobe Photoshop files from our hard drive. Once the data was written, however, we were able to access the files quickly.

This drive costs $2195 with one removable disk ($70 for additional disks) and $2699 for an external. Optical disks are long lasting and not subject to accidental magnetic erasure. And this drive also lets you put write-once protection on permanent archive disks. Other notable vendors in this product class include Alphatronix, Maxtor, Pinnacle Micro, and Sony. *IBM, 800/426-7299*

The Pinnacle RCD 1000 Recordable CD unit writes CD-ROMs in ISO-9660 format, readable on any standard drive. The 650MB write-once CD-ROM media boasts high capacity and a small physical size, and it's durable and long-lived—all of which are good archiving characteristics.

We found archiving important files to be no trivial task, with the size of files counting less their number: A glut of small files is harder to deliver smoothly, and any interruption is fatal, resulting in the loss of a $29 write-once disc. The Pinnacle records at either the 1X or 2X speed we used. The 500MB transfer we did with the IBM drive took about 10 minutes to prepare and a reasonable 40 minutes to archive.

The Pinnacle costs about $1795, well worth it if you need to distribute and update database apps, manuals, graphics and multimedia files, and software installations. Your CD-R drive will also serve as a capable archiving tool, but the high cost and complexity of CD-R argue against purchasing one of these drives solely as an archival device. *Pinnacle Micro, 800/553-7070* Reader service no. 786

—Rex Farrance

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Double-click with just one click.

SMARTER BUTTONS
Program any mouse button to perform the following repetitive tasks:

- LOCK BUTTON. *Just click once and you can drag, scroll, or highlight large blocks of text without having to hold the button down.*
- SEND KEYS. *Save time by executing multi-step commands with a single click. You can print a document, enter a block of text, log onto a network, download your e-mail, even send a fax from your fax/modem.*
- SHORTCUTS. *Work faster by automating frequently used Windows commands. You can open and close a file, copy, paste, switch to task list, and a lot more. Just click once to execute any command.*

SMARTER CURSOR
Brilliant Cursor® technology saves time and jumps cursor to defined screen HotSpots. Save even more time and have cursor automatically jump to default button.

SMARTER SIDES
Rubberized EasyGrip™ sides for more comfort and control.

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A single button click brings up a personalized pop-up menu. Use it to organize and execute commands within your favorite programs. Create a different menu for each program.

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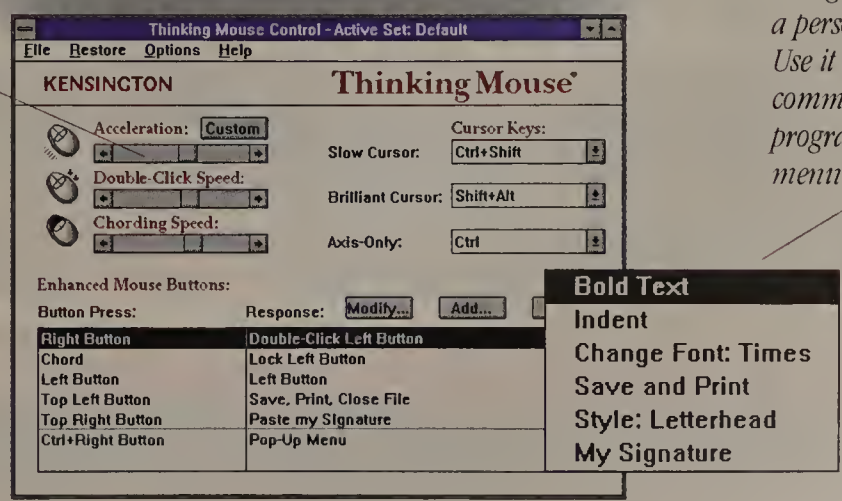

It has four programmable buttons. More than a dozen time-saving functions. You can even create a personalized pop-up menu for each of your favorite programs. And the hardware is as smart as the software—with rubberized EasyGrip™ sides for more comfort and control. Includes software for Windows, OS/2 and DOS. Available in Serial & PS/2 and Bus versions. 100% Microsoft compatible. For more information, call Kensington at 800-535-4242. Outside the US and Canada, 415-572-2700. For information by fax, call and request document 324.

Thinking Mouse
4-Button Programmable Mouse

KENSINGTON

EDITORS' HomeOffice COMPUTING PICK

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Circle 235 on reader service card

MicroSolutions backpack 900

PROS: Fine design, QIC-Wide compatibility, ultraquiet, compact, easy installation
CONS: So-so performance, premium price

This external unit is built around Conner's quiet, smooth drive mechanism, so it handles QIC-Wide tapes. But it's designed with an external power adapter, and the case is actually smaller than Conner's. And it sports a power-on LED, which the Conner lacks.

This QIC-3010's main drawbacks are a $499 street price (about $30 higher than the Conner unit) and no included tape minicartridge. Still, it's a good value: With its two-year warranty and Arcada software, it's a pleasure to install and use. *MicroSolutions, 800/890-7227 ext. 200, 815/756-3411 ext. 200* **Reader service no. 781**

Rexon Wangtek 700MC

PROS: Good QIC-3010 performance, fits into a 1-inch-high drive bay
CONS: No accelerator card option

Rexon's $299 Wangtek 700MC is a fast QIC-3010 internal drive—ranking among the quickest here. The noise level is just a whisper louder than that of Conner's drives. Rexon doesn't offer an accelerator card, so if you have an older PC, you'll have to go to a third-party vendor to get a card that will work with your drive.

Rexon bundles the drive with Arcada's terrific Backup software. This is a solid offering, and with a two-year warranty and a reasonable price, it's a fine value from a well-respected tape backup manufacturer. *Rexon, 800/422-2587, 216/349-0600* **Reader service no. 782**

FEATURES COMPARISON Backup Capacities Rise to 1400MB

● = Yes ○ = No
n/a = not applicable

	INTERNAL MODELS					EXTERNAL MODELS			
	Colorado Jumbo 700	Conner Tape-Stor 850	Exabyte EXB-1500	Iomega Ditto700	Rexon Wangtek 700MC	Colorado Trakker 700	Conner Tape-Stor 850	Iomega Ditto700	MicroSolutions backpack 900
List price/street price[1]	$321/$279	$349/$299	$399/$329	$350/$299	$349/$299	$529/$469	$529/$469	$540/$479	$599/$499
Capacity and formatting									
Tape format	QIC-3010	QIC-3010	QIC-3020	QIC-3010	QIC-3010	QIC-3010	QIC-3010	QIC-3010	QIC-3010
Formatted capacity (MB)	340	425 (QIC-Wide)	680	340	340	340	425 (QIC-Wide)	340	425 (QIC-Wide)
Estimated maximum capacity with compression (MB)	680	850 (QIC-Wide)	1400	680	680	680	850 (QIC-Wide)	680	850 (QIC-Wide)
Tape price	$32	$30	$39	$110/3	$31	$32	$30	$110/3	$65/2
Read/write QIC-Wide	○	●	○	○	○	○	●	○	●
Specifications									
Interface	floppy controller or accelerator card ($70)	floppy controller or accelerator card ($80)	floppy controller or accelerator card ($79)	floppy controller or accelerator card ($79)	floppy controller	parallel port	parallel port	parallel port	parallel port
Fits 3½-inch-wide drive bay	●	●	●	●	●	n/a	n/a	n/a	n/a
Fits 1-inch-high drive bay	○	●	○	●	●	n/a	n/a	n/a	n/a
Mean time between failures[2]/duty cycle	100/20%	150/20%	100/10%	200/25%	100/20%	100/20%	100/20%	200/25%	60/5%
Bundled software									
DOS	Colorado Backup 4.07 for DOS	Conner Backup Exec 2.1f for DOS	Arcada Backup 4.0 for DOS	Iomega Backup Plus 4.0 for DOS	Arcada Backup 4.1 for DOS	Colorado Backup 4.06 for DOS	Conner Backup Exec 2.1f for DOS	Iomega Backup Plus 4.0 for DOS	backpack Backup 4.1 for DOS
Windows	Colorado Backup 2.02 for Windows	Conner Backup Exec 2.1f for Windows	Arcada Backup 4.0 for Windows	Iomega Backup Plus 4.0 for Windows	Arcada Backup 4.1 for Windows	Colorado Backup 2.02 for Windows	Conner Backup Exec 2.1f for Windows	Iomega Backup Plus 4.0 for Windows	backpack Backup 4.1 for Windows
Service and support[3]									
Toll-free technical support	○	●	●	●	●	○	●	●	○
Daily support (hours)	11	11	9	10	12	11	11	10	9
Weekend support	○	○	○	○	○	○	○	○	○
Repair turnaround (days)	1	1	5	5	5	1	1	5	5
Fax	●	●	○	●	●	●	●	●	●

BEST BUY

[1] Street price averaged from a major superstore, a catalog reseller, and a computer reseller. Street prices for Rexon and Exabyte units are estimated, as the models were unavailable in stores at press time.

[2] In thousands of powered-on hours.

[3] All vendors offer a two-year warranty and a BBS.

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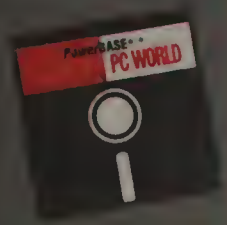

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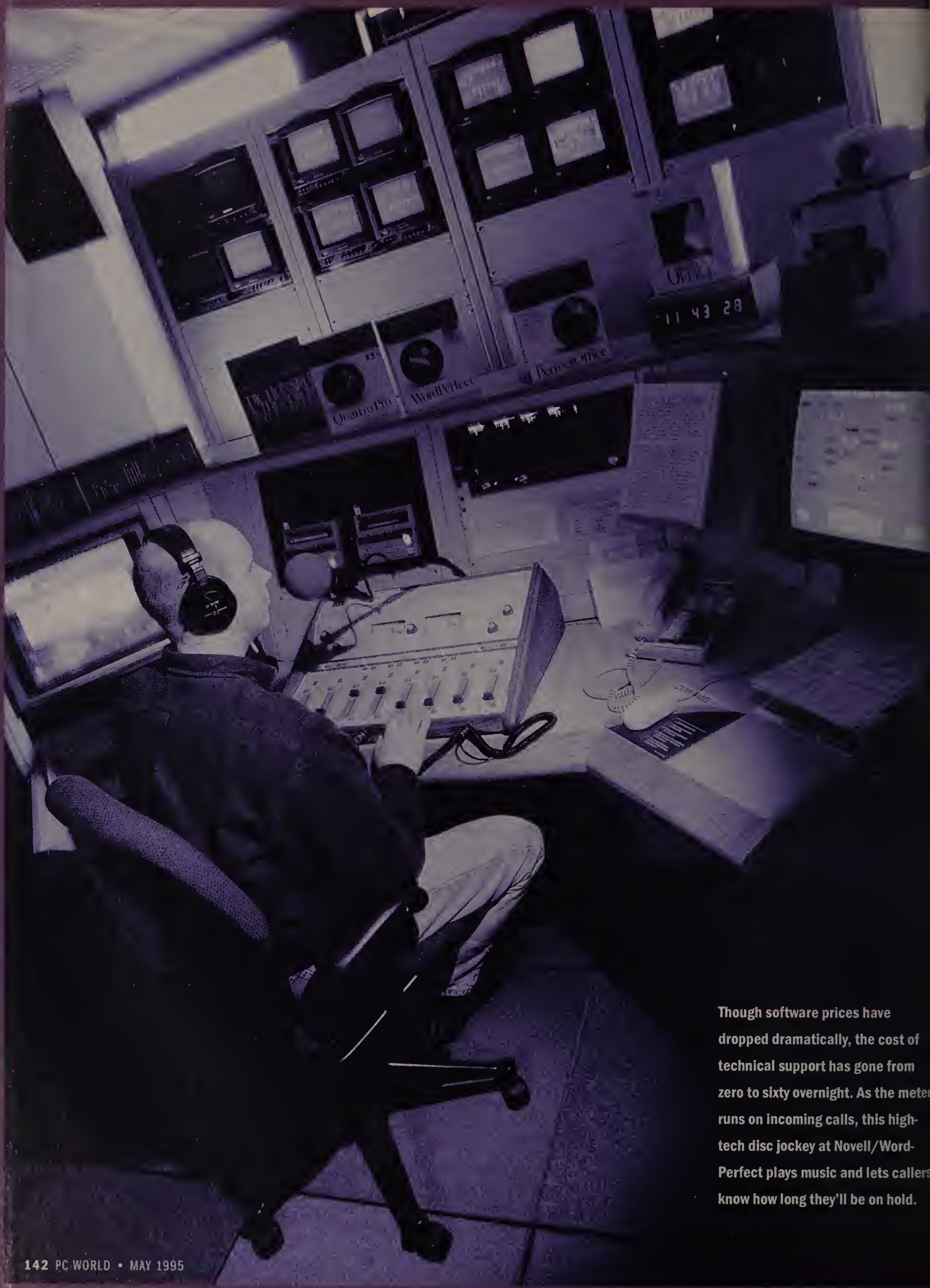

Though software prices have dropped dramatically, the cost of technical support has gone from zero to sixty overnight. As the meter runs on incoming calls, this high-tech disc jockey at Novell/WordPerfect plays music and lets callers know how long they'll be on hold.

The Hidden Cost of Tech Support

WHEN YOUR SOFTWARE LETS YOU DOWN, WHO SHOULD YOU CALL AND HOW MUCH WILL YOU PAY?

IN THE INSURANCE BUSINESS, IT'S CALLED "GOING BARE." For many PC users, it's become a way of life. Software companies, third-party support firms, and even some PC makers increasingly are trying to sell you what used to be considered a right: insurance against the day that you and your software need mediation—the service known as technical support.

The simple task of picking up the phone and calling for help has turned into a complex (and potentially expensive) decision tree. For many consumers, deciding how—and who—to pay for technical support has become more difficult than selecting an application itself.

BY CHRISTINA WOOD

CHANGING TIMES

The furor over software support started in September 1993, when Microsoft announced plans to charge for some services. That announcement started a chain reaction that spread throughout the software industry. Interestingly, Microsoft never actually announced a switch from free to fee-based support; it announced fee-based plans *in addition* to free lifetime support on all desktop applications. But in short order, all the major software publishers—Lotus, Borland, Corel, Claris, and even WordPerfect, renowned for its free service—announced plans to charge for support. As this article was going to press, Micrografx—one of the last holdouts—announced its own fee-based plan. And many observers say we haven't heard the last of the announcements.

Why the flurry of activity? In a word, economics. Software is cheap. Remember when you used to pay $400 for a major business application? Today you can pick an entire suite—spreadsheet, database, *and* word processor—for the same amount. Software price wars trimmed the fat margins that once helped pay for technical support departments. And although consumers love the low prices, software companies are feeling the pinch. One of the first places they're looking to cut costs is the high-overhead technical support departments.

Over the past year software companies have introduced everything from 900 phone lines to credit cards, annual plans, and customized service offerings for users with heavy-duty needs. Independent support providers have entered the mix, claiming to offer one-stop calling for all your support needs. And if those options aren't confusing enough, PC companies are increasingly selling—and supporting—major applications. (See "Weaving Through the Maze of Support Options" for a guide to picking which service is right for you.)

Members of the support department at Novell/WordPerfect camp out on the phone as they field questions from customers. Service will play a key role in the company's future business plans.

What have all these changes meant to the average consumer? Are PC users bailing out software companies by paying exorbitant support fees? And how should these changes affect the way you buy software?

One year after the support plans went into effect, we set out to answer these questions. We polled our readers on their opinions about the quality of technical support—and how they feel about footing the bill. We also spoke with software company execu-

Customers Give High Marks to Tech Support

In our extensive survey of software technical support users, three major software vendors performed equally well. Only the reported average hold times reveal a statistically significant difference between companies, with Lotus the winner.

	Speed of response	Accuracy of response	Courtesy	Follow-through	Satisfaction	No wait when calling	Time on hold	Calls to resolution
Lotus	3	3.2	3.4	2.8	3.4	39.3	3.7	1.3
Microsoft	2.9	3.2	3.5	2.9	3.4	44	8.2	1.5
WordPerfect	3.1	3.3	3.5	3	3.4	40.3	5.4	1.5
	1 (poor) to 4 (excellent)	1 (poor) to 4 (excellent)	1 (poor) to 4 (excellent)	1 (poor) to 4 (excellent)	1 (not at all) to 4 (very)	Percent	Minutes (average)	Calls (average)

Based on responses to PC World's November 1994 Software Technical Support Study.

Methodology
PC World's Software Technical Support Study was mailed to 2100 randomly selected PC World subscribers in the U.S. To allow for the largest number of responses on a variety of companies, we developed six different questionnaires. Using random sampling procedures, we pulled six groups of 350 subscribers from a 3000-person sample. Software companies included in the study were Aldus, Borland, Broderbund, Corel, Intuit, The Learning Company, Lotus, Micrografx, Microsoft, Software Publishing, and WordPerfect. On November 18, 1994, we sent an eight-page questionnaire to each person in the sample, along with a cover letter explaining the purpose of the study, a postage-paid envelope, and $1 as an incentive to respond. A follow-up postcard was sent December 19. We received a response rate of 33.2 percent.

ROBBIE MCCLARAN

WEAVING THROUGH THE MAZE OF SUPPORT OPTIONS

When Paula Horney, department analyst for the Santa Barbara, California, municipal court, was asked to recommend a drawing package to the county, she found herself fashioning a three-page spreadsheet to keep track of prices, features, and what she called the hidden costs: technical support. "I don't object to paying for support," she says. "But I'd rather see the cost of support included in the price of the software." Buying software is a small part of her job, which includes providing technical support and keeping an eye on her department's resources. But since software publishers started charging for technical support, that task has gotten much more complicated.

And Horney isn't the only one trying to find the best strategy for buying software and support. Roughly 40 percent of the respondents to our software support study said they had changed the way they buy software in response to having to pay for support. The most common reaction (cited by 28 percent of respondents) was to stop upgrading or buying new software, presumably in the hope that they won't need support for products they know well. Other responses included buying all applications from one company (10 percent), buying software from companies with nominal support fees (9 percent), buying software suites (7 percent), buying less expensive software (7 percent), and buying support from a third-party provider (4.3 percent).

Your reaction will depend on the support you need. But don't ignore the problem, hoping it will go away. The worst choice is to do nothing, while formulating a strategy can save you money. We did some of the legwork for you. The following scenarios reflect the needs of three types of users: corporate environments, small offices, and individuals.

THE CORPORATE OFFICE

If you manage an ever-changing staff with varying skill levels, you might be tempted to let employees figure out solutions to problems by themselves, rather than pay for a support plan. But saving here can cost you more than you think. According to Joe Jacoboni, president of Software Support, an independent support provider, "the most expensive support option a company can implement is sneakernet to the PC guru." And the math makes sense. If you have an employee who earns $30,000 a year posing software questions to an employee bringing home $50,000 a year, you're wasting money and productivity on inefficient support. With a support number handy, employees can get their questions answered quickly—without eating up the time of a high-paid professional.

The best support for any single product comes from its developer. The publisher has the history, the experience, and the development team, giving it an advantage over other providers. So if all your critical applications are from the same publisher, that's who you should pay for support. But if you use software from a variety of companies, your support choices are more complicated. If your staff is not a group of power users, think about going to a third-party technical support provider. In addition to support, the independent provider can give you usage reports and identify staff members in need of additional training.

THE SMALL OFFICE/HOME OFFICE

If you have a small business, technical support can be a great investment. Unlike big corporations, you don't have an MIS staff at your disposal when you hit trouble. Nor can you turn to Albert the spreadsheet jockey in accounting when you point and click your way into a corner.

If you use software from different publishers, a support plan from a third-party provider would cost only about $150 a year for one user, and you could just pick up the phone for help. Just be sure to shop carefully for a company capable of answering the questions you're likely to have (see "Third-Party Support: Is It Worth the Money?").

If all your critical software comes from a single publisher, that's who you should turn to for technical support.

THE HOME USER

Most publishers of home applications don't charge for technical support, but if you want to have help available for the business applications you use at home, consider the cost of support before you buy software. The maker of your home PC (if it came with software installed) may be a good place to start (see "PC Makers' Support: Is It Good?"). But chances are you'll need something more.

You can always call the 900 line at a third party or the software publisher, but that can be expensive. If you don't want to spend any money, go online. Online support is free from most publishers, but the wait for answers can range from a few hours to a day or two. If you suspect your question is a simple one others have asked, try the automated response number at the software publisher. There you'll navigate voice-mail menus to hear answers to commonly asked questions—for free. —C. W.

"I'd rather see the cost of support included in the price of the software," says department analyst Paula Horney of Santa Barbara, California.

tives, customer service experts, and PC company representatives. Then we tried the support offered by independent support providers to see just how good these upstart newcomers are.

What we discovered surprised us. Where we expected discontented consumers, we found satisfied ones. Where we expected competition, we found cooperation.

THE RIOT THAT NEVER WAS

Most software companies have tried to put a positive spin on support charges, pointing out that fee-based plans make it possible to provide the quick, quality service demanded by corporate customers. Still, some industry analysts and software executives feared that the charges would drive customers to other publishers, that support departments would have to field dozens of calls from irate users, and that customers' expectations for the quality of paid support would exceed the publishers' ability to deliver.

Given all the dire predictions, we were surprised to find that 55 percent of the respondents to our survey were very satisfied with the service they'd received from software companies. Thirty-two percent were somewhat satisfied; only 4 percent reported they were not at all satisfied. And although none of the readers we spoke to said they *wanted* to pay for technical support, 38 percent of those who paid said they thought they'd gotten their money's worth.

"We expected major complaints from customers. But we were completely surprised by the lack of them," admits Sid Saleh, product manager for support services at Claris, which in April 1994 moved from an optional fee-based plan to one with a 90-day grace period followed by paid support. The reason for so few complaints, according to Saleh, is that customers were warned long in advance of the charges, and—more important—the support that they got was good. "You can't charge for something if you're bad at it," he notes.

John Cary, the owner of Cary Printing and

The Key to the Software Support Riddle

● = Yes ○ = No

n/a = not applicable

Company [1]	Borland International	Claris	Computer Associates	Corel
Product	dBASE, Paradox	FileMaker Pro, Claris Works	CA-Accpac Accounting line, Simply Accounting	CorelDraw, CorelFlow, Corel Gallery, Corel Photo-Paint, Corel Ventura
Duration of free support	[2]	90 days from first call	90 days from purchase date [3]	One to two free calls
Tech support number(s)	408/461-9110 (dBASE, Win)	800/234-4750	516/342-5466 (Simply Accounting)	800/818-1848
Daily support (hours)	11	12 [6]	13 [7]	16
Weekend support	○	○	○	○
Fee-based plans				
Accelerated service available	○	●	○	○
900 line	900/555-1009 (dBASE, Win) 900/555-1006 (P'dox, Win)	900/230-3000	○	900/896-8880
Cost per minute	$2, no cap	$2, 2 minutes free, no cap	n/a	$2, no cap
Credit card payment line	800/285-1118 (dBASE, Win)	800/234-4750	516/342-5466 (Simply Accounting)	800/818-1848
Cost	$2/minute, no cap	$2/minute, 2 minutes free, no cap	$2/minute, $30 minimum, no cap	$25/Incident
Annual plans	Unlimited toll-free support 6 a.m. to 5 p.m. (PST), M–F $149. Priority hotline for a single application, 6 a.m. to 5 p.m., M–F $249.	Unlimited toll-free calls, faster call routing during standard business hours $129. Calls take priority in queue $499.	Unlimited toll-free calls, faster call routing $50.	$695; companies with five copies of the same Corel product get unlimited support for five users.
Cost per call for prepaid pack of questions	n/a	n/a	n/a	$17.50 to $20
Alternate support				
Online services	BIX, CompuServe, GEnie, Internet, World Wide Web	America Online, CompuServe	CompuServe	CompuServe
Fax/BBS/hearing-impaired line	●/●/○	●/●/●	●/●/○	●/●/○
Automated voice response	●	●	○	●

[1] Adobe Systems was redesigning its support offerings at press time and is not included in the chart.

[2] Free for installation and configuration only.

[3] Unlimited for home products.

[4] Support on personal operating systems is free for 90 days after first call.

Graphics in Los Angeles, sums up the feelings of many respondents when he says he has no problem paying for support "as long as the person I'm talking to knows more than I do. And usually these companies [he has called Microsoft, Broderbund, and Aldus] have informed individuals who give me good ideas."

Small-business owners such as Cary are willing to pay as much as $500 for support because they rely on their PCs to keep their operations running smoothly, says Bill Rose, executive director of the Software Support Professionals Association. Cary agrees. "The cost is irrelevant if I get the support I need. The downtime is more expensive than the service. If I get up and running sooner, I'm dollars ahead," Cary notes. "What's $2 per minute if you're on the phone with them maybe eight or nine minutes?"

Still, while Cary and other advanced users we talked to were generally satisfied, many remarked that service was inconsistent. "It's a crapshoot," says Cary. "You definitely take a chance, and if I get a technician who knows less than I do, it's not worth my time and money."

And Cary appears to be speaking for many of those who responded to our survey.

"The cost is irrelevant if I get the support I need," says John Cary of Los Angeles.

Lotus	Micrografx	Microsoft	Microsoft	Novell/WordPerfect	Symantec
Desktop applications	Business applications	Desktop applications	Home products	Business applications	Act, DiskDoubler, Norton Backup, Norton Utilities, pcAnywhere, and others
90 days from first call	30 days from first call [3]	unlimited [4]	unlimited	6 months from first call [5]	90 days from first call
508/988-2500 (Windows) 508/988-6400 (DOS) 508/988-2820 (OS/2)	214/234-2694	800/936-3500 (information)	800/936-3500 (information)	800/638-9273 (information)	503/465-8645 (Act), 800/441-7234 (others)
12	10	12	12	12	9
○	○	○ [8]	○ [8]	○	○
○	○	●	●	●	●
900/555-6887	900/847-8477	900/555-2000	900/555-2400	800/321-5906 (information)	900/646-0001 (Act)
$2.95, $50 cap	$2, $40 cap	$1.95, $25 cap [9]	$1.95, $15 cap	$2, no cap	$2, 1 minute free, no cap
800/553-4270	214/234-2694	800/936-5700	800/936-5600	800/321-5906	800/927-3989 (Act)
$35/incident	$25/incident	$25/incident	$15/incident	$25/incident	$25/incident
24 hours daily for Windows Suite, Improv, 1-2-3 DOS products $195. 12 hours M–F for desktop products $179.	[10]	35 incidents per year for desktop applications and operating systems $395. Premium support plans available.	35 incidents per year for desktop applications and operating systems $395. Premium support plans available.	12 hours daily $249. 24 hours daily $349. Other options available. Call 801/228-9926.	Unlimited toll-free calls 11 hours daily, average hold time of 3 minutes or less $149.95. Premium support plans available.
n/a	$17.50 to $20	$25	n/a	$25	n/a

CompuServe, World Wide Web	America Online, CompuServe	America Online, CompuServe, GEnie, Gopher, Internet, World Wide Web	America Online, CompuServe, GEnie, Gopher, Internet, World Wide Web	America Online, CompuServe, SpaceWorks (800/577-2235)	America Online, CompuServe
●/●/●	○/●/○	●/●/●	●/●/●	●/●/●	●/●/○
○	○	●	●	●	○

[5] Unlimited free support for consumer applications. Groupware support usually includes three free incidents.

[6] 8 hours Fridays.

[7] 9 hours for CA product line.

[8] Available at additional charge.

[9] No charge if reporting a program bug.

[10] Fee-based plan announced at press time; details not available.

While most respondents indicated that the answers they got from technical support departments were fast and accurate, overall they rated 18 percent of their calls to technical support poor or fair on accuracy, and 28 percent of the calls poor or fair on speed. This indicates that even the companies best at supporting their products are still not perfect on every call. Courtesy, however, is another matter, and perhaps goes a long way in explaining why customers are so content with the support they got: Readers rated 93 percent of all their calls to technical support departments good or excellent on courtesy.

But customers aren't willing to pay for even stellar support if they think the software company is to blame for a problem—buggy software or unclear documentation, for example. Vincent Kerner, a computer consultant in Downers Grove, Illinois, told us he rarely needs to call for technical support—unless he's dealing with a buggy package. Although policies vary when it comes to paying for bug-related calls, Kerner says, "if you scream loud enough on those calls, they don't charge you." Overall, 15 percent of the instances reported were about buggy software, with WordPerfect customers reporting the highest incidence of bug-related calls, at 24 percent.

Regardless of the nature of the calls, most software companies have gotten pretty good at picking up the phone. The legendary long hold times in technical support queues, for example, don't seem to be supported by the real experiences of our readers. The average caller to the companies in our survey waited on hold for 4 minutes. And once readers did get through to a technician, 58 percent got their questions taken care of immediately; 61 percent said their question was answered on the first call.

CONFUSION REIGNS

But that's not to say that all is rosy in technical support land. It's not. The biggest problem is confusion. Buying technical support is mind-boggling—witness the two huge charts we needed to explain the options.

Most companies allow a grace period (from two phone calls to six months) when they'll answer questions for free. That's where simplicity ends. After the grace period, the options for spending your support dollars are labyrinthine. You can call a 900

THIRD-PARTY SUPPORT: IS IT WORTH THE MONEY?

It's late at night. Your desk is littered with fast-food wrappers, stained coffee mugs, and software manuals. You've finished crunching numbers in 1-2-3. Now you need to pour the chart into a WordPerfect for Windows document and print it in time for a 9 a.m. meeting. But you can't do it and the manuals are incomprehensible. You're desperate and thinking about dropping your computer down an elevator shaft. Who can you call for help?

You could call the support line at Lotus, WordPerfect, or Microsoft, but they'll probably point fingers at each other. What about an independent support provider? These firms promise to help with almost any product—for a fee—and are on call 24 hours a day, seven days a week.

Now that most software companies charge for support, the independents are growing in number and capabilities. And they fill a niche the software makers can't.

Many independents also receive training from the developers and have direct access to their support databases and personnel. These firms "excel at providing one-stop solutions for a broad range of products, especially the more mature business applications," says Bob Johnson, director of software services research for Dataquest in Framingham, Massachusetts.

The independent support business is booming. According to Dataquest, the top 25 firms averaged 1.2 million support calls apiece last year—more than double their 1993 volume. "'Exploding' is an insufficient term to describe the growth of this industry," says Johnson.

Much of this growth comes from big corporations, which find independent support firms much cheaper than $60,000-a-year technicians. Now these support providers are reaching out to smaller businesses and individual users with unlimited, low-cost support plans.

But are these services worth the money? What level of support do they provide? And when should you go to a third-party firm instead of the manufacturer? Here's what we found out.

PUTTING SUPPORT TO THE TEST

We purchased support services anonymously from five companies that offer help to individuals and small offices. Our lineup included Digital, IBM End User Support, PC Helps Support, Softmart, and Software Support. We'd have included Keane, Microage, and Unisys as well, but at press time these firms did not have systems in place to handle calls from individual users. We also tried to include CompUSA, but again, its 900 support line was not equipped to answer any questions about software use. However, according to Rick Fountain, senior director of technical services for CompUSA, the company will provide tutorial support for major business applications by the time you read this.

There's a dizzying array of options for purchasing support: 90-day or one-year contracts, blocks of calls at volume discounts, and pay-as-you-go plans, with calls charged by the minute to your phone bill or credit card. When possible, we chose the latter option. We wanted to size up their service, not make a year-long commitment. IBM, PC Helps, and Software Support all provide support for between $2 and $3 per minute.

Because Digital and Softmart don't sell support by the minute, we bought 90-day and annual contracts. Digital's Service in a Box and Softmart's Software Pal offer unlimited calls for $144 and $160 per year, respectively.

Then we hit the phones. We had five researchers call each company, posing as average customers with problems using leading Windows word processor, spreadsheet, and database applications. The questions included simple problems like rotating text in WordPerfect, as well as challenges requiring in-depth knowledge of spreadsheet formulas. Each person placed three calls to every firm—in the morning, after-

noon, and evening—for a total of 15 calls per company. They then gauged the entire support experience, from the music while on hold to the accuracy of each answer. As a reality check, we called support lines at the software vendors to see how they answered the same questions.

Overall, the Independents answered slightly less than 60 percent of our questions. (The software vendors aced more than 80 percent of the calls in their applications.) Only premium-priced PC Helps Support gave us correct or partial answers to all of our questions. Otherwise, the quality of the help we received varied more between individual technicians at each company than between the companies themselves.

ON THE FRONT LINES

In general, our callers had no problem reaching technicians quickly. We averaged less than 3 minutes on hold—and around 90 seconds on the per-minute lines. PC Helps was best, with hold times averaging a scant 20 seconds, while Softmart usually made us listen to elevator music for more than 6 minutes.

However, few support personnel had the answers at their fingertips. A typical call lasted about 14 minutes, much of it spent waiting while the technician tried to duplicate the problem or scanned reference materials.

PC Helps provided accurate responses in the shortest amount of time—about 7 minutes per call. Unfortunately, PC Helps is also the most expensive service we tested. Annual contracts start at $4000, although you can also buy 106 minutes of phone time for $250. Also, PC Helps supports only 150 applications, fewer than three of the five companies we called.

IBM's End User Support proved tops among the lower-cost plans, handling three-quarters of our questions with aplomb. The other firms were a mixed bag, answering from one-third to slightly more than half of our questions correctly.

WHEN THE METER'S RUNNING

Our research uncovered important differences in quality between some companies' per-minute support and their annual plans. IBM's 900 number, for example, provides support for 100 DOS, Windows, and OS/2 applications—only about one-seventh the number supported through the company's annual plan. To get answers to our questions about Lotus Approach, we had to buy an annual plan.

Software Support's $3-per-minute help line missed the mark on two-thirds of our questions. When we confronted the company with our findings, vice president of marketing Kera Martin said Software Support's 900 number is handled differently from its toll-free support plans. On the 900 line, pay-by-minute callers are routed to the next available technician, who may be less familiar with the user's software than the experts who field calls on the other plans. She

(Continued on page 150)

Independent Merchants Offer Unbiased Advice

● = Yes ○ = No

n/a = not applicable

Key features	Digital Equipment Corporation	IBM End User Support Center	PC Helps Support	Softmart	Software Support
Contact	800/722-9332	800/964-8523	800/869-9327	800/354-2725	800/756-4463
Approximate number of software products supported	300	700	150	200	150
Daily support (hours)	24	12 [1]	12.5 [1]	24	24
Weekend support	●	○ [1]	●	●	●
Cost of annual plan	$144/user	$120 to $207/user	$4000 to $160,000	$159.95/user	$200/user
Cost per call for prepaid pack of questions	$50	$15 to $47	n/a	n/a	$15 to $25
Cost per minute (900 number or credit card)	n/a	$2 (1 min. free)	$2.25	n/a	$2.95 (2 min. free)
Average cost for paid call	n/a	$23	$15.75	n/a	$20.36
Free hold time	●	○ [2]	●	●	●
Free if problem is not solved	○	●	●	●	○
Multiuser plan available	●	●	●	●	●
Who answers the phone	Automated routing system	Attendant	Support technician	Automated routing system	Automated routing system
Online support	●	○	●	●	○
BBS	●	○	○	●	●
Fax	○	●	○	●	●
PC World research [3]					
Average time on hold (minutes)	2.3	2.0	0.3	6.2	1.9
Average length of call (minutes)	19.3	11.9	7	18.3	10.5

[1] 24 hours and weekends under some annual plans.

[2] Refund available.

[3] Based on calls made from November 1994 to January 1995.

number and pay through the phone company. Or you can charge the support to your credit card—either by incident or by the minute. You can buy an annual plan that covers any questions you—and often other members of your company—may have in a year. Or you can buy a package of, say, ten calls to use anytime. Claris even offers a prepaid credit card. You get a wallet-size card with a PIN number good for however many minutes of help you ordered.

But it isn't merely a simple matter of deciding *how* you want to pay. You also have to decide what level of support you want to pay for. The annual plans often come in as many as three configurations with increasing levels of service. Many plans include 24-hour-a-day, seven-day-a-week service. And the options get better from there. Benefits vary by company, but they often include accelerated response time, a technician dedicated to your account—even house calls. If you have applications from a host of different publishers, multiply the choices—and the costs—by the number of companies you deal with.

TAKING SERVICE TO NEW HEIGHTS

Although the changing players and multitude of options can be dizzying at times, the changes are part of a larger transition in the software industry. As the differences between applications flatten out and spreadsheets and word processors begin to look—and cost—about the same, service is what will distinguish one company from another.

As corporations downsize, eliminate internal help desks, and move from the mainframe to the desktop, software publishers plan to supply complete service offerings. For example, the newly merged Novell/WordPerfect venture recently announced a range of high-end services for its corporate customers. Besides the fee-based plan it started in October 1993, it has launched programs with a high level of service reminiscent of the old mainframe days—with such options as a dedicated Novell engineer, on-site service, and internships at Novell/Word-

JAMES YANG

(Continued from page 149)

claimed we would have a better experience with an annual plan.

When we dialed Software Support's annual plan to verify this claim, we got better answers, although not all were correct. Shortly after, the company announced a change to its 900-number service: Once a call reaches $50, the technician will call back at no additional charge and find a solution.

The per-minute lines also proved expensive—and customers may have to pay whether or not they get the right answer. One researcher spent a frustrating 25 minutes on the phone with a chatty IBM tech, never received a solution to his Paradox problem, and was charged $50 for the pleasure.

According to Paul Heintz, planning and marketing support manager for IBM, dissatisfied callers should ask to have such charges taken off their bills. At PC Helps, refunds are decided on a case-by-case basis. "If customers can't do what they want to do with the application, we tell them that and bill for the call," says Jeffrey Becker, vice president of marketing for the company. "If we tell them the wrong answer, we'll take the charge off their credit card."

However, Joe Jacoboni, president and CEO of Software Support, says, "If we invest the time and expertise to try to solve a problem and there is no answer to the problem, that's a risk someone using a 900 number is taking."

HITTING THE WALL

We also discovered limits on how some companies define "support." For example, a Digital technician politely declined to help write an Excel formula, saying the question was more appropriate for Digital's $250-an-hour consulting service. Jack Sanderson, operations manager for software product services at the company, says the technician should have answered the question. "We don't want to spend time debugging large macros," he said, "but building a formula is part of learning to use the software."

A Software Support technician also declined to answer our Excel question, a response Jacoboni says is in keeping with the company's policy. "We're not a training company, we're a support company," he says. "The price we'd have to charge for that service would be much larger than the price we charge for support."

When we posed our Excel question to IBM, the tech babbled for a few minutes about possible solutions, then referred us to Microsoft. Only PC Helps and Softmart helped us create the formula, although each answer had errors.

HELP YOURSELF

Independent support providers can't always provide the expertise of a software publisher, but if you need help with a broad range of software, they may be your best option.

Before you sign up with a service provider, do some research. Call firms and ask about their areas of expertise. Some focus on standard business packages, while others excel at networking, accounting, or other specialized applications. Find out how long it's been in business, and what else it does besides support.

Always try a service before you buy, preferably by purchasing a small block of calls or a three-month trial plan. Check to see if they're willing to answer the kinds of questions you're likely to ask. And note the technician's attitude—If he or she seems hurried or condescending, move on. No firm can answer every question you throw at it, but you want it to be a pleasant experience. And once you sign up, don't hesitate to speak up if you're unhappy with an answer or a charge. It may not always work to complain, but you don't want to pay for a technician's mistake.

Annual plans make the most sense economically. But if you're buying for an entire department or company, it's probably better to start small and add more as you need it. The support industry is undergoing tremendous flux, and some companies may not be around next year; you don't want to buy services you can't use.

Daniel Tynan is a contributing editor for PC World. Research assistance provided by Evan Hansen, Sarah Klein, Amanda Lewis, Tim Mathis, Celeste Robinson, Valerie Singer, Ralph Soucie, and Jonathan Spencer.

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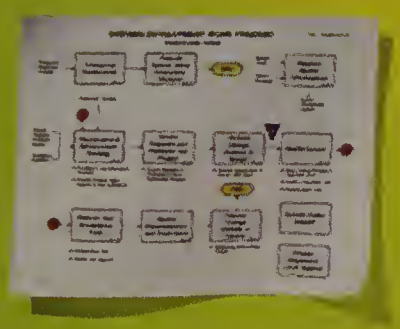

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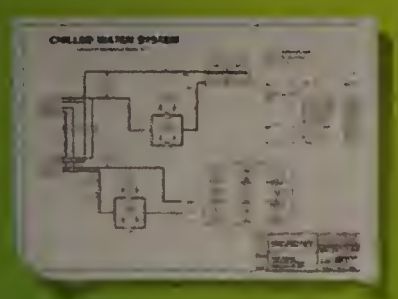

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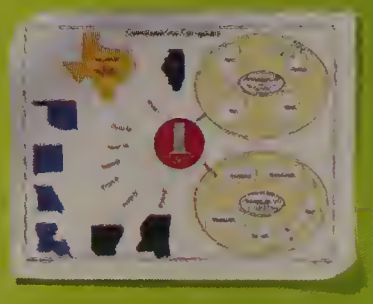

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Lotus, too, sees service as the wave of the future—and the way to compete in a world dominated by the gargantuan Microsoft. In a notable break from standard software business practice, the company hired a director of service product marketing, Michael Hayes, whose job it is to *market* the company's service offerings. "People are betting their businesses on our products now. Companies are downsizing from mainframe environments, and we want to be there to meet them with our services," Hayes says. As we went to press, Microsoft announced its Premier Global support plan for worldwide service. And Lotus already has its Passport program. "Passport allows you to buy products around the world and get them serviced around the world. Your Lotus support identification number travels with you and lets you get support no matter where you go," explains Hayes.

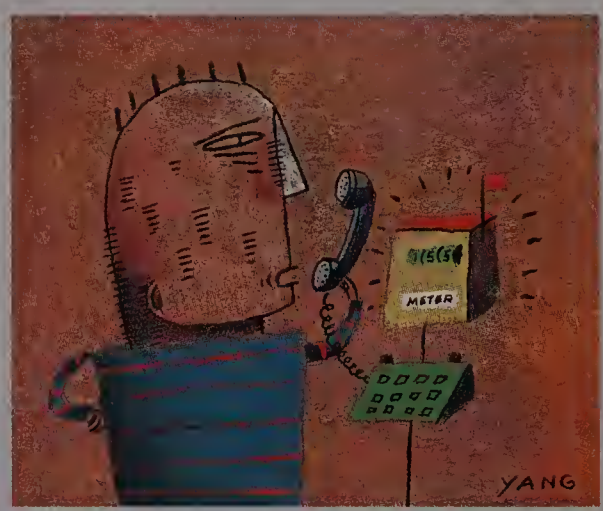
HOME REPAIR

The one customer largely unaffected by the pay-for-service trend is the home user. Although the home market is the fastest-growing segment of the computer industry, home users are also the least likely to want to pay for technical support.

And for now, at least, none of the major players in the consumer market are charging for these services. "We fundamentally believe that support needs to be cheaper and

PC MAKERS' SUPPORT: IS IT GOOD?

In a perfect world, you'd be able to pick up the phone, order a computer loaded with software, then call the same number to find out why the spreadsheet and database that came with your new PC can't be made to work together. Well, this world isn't perfect, but PC companies are trying to make shopping for all your computer needs as simple as possible. They'll sell you the computer, the software, and the support for one low price. It's an appealing concept, but don't be overcome by its beauty. This is one bargain that often falls short of the ideal.



SUBTLE DISTINCTIONS

PC companies sell software in one of two ways. In one scenario, the company agrees to manufacture, sell, and support an application. In the other, the company simply buys the software disks and manuals and resells it to you. And though the distinction may seem esoteric, it has a real bearing on your support options.

Take Gateway and Compaq, for example. Both offer Microsoft software with their PCs, but that's where the similarity ends: Gateway has an agreement with Microsoft to support software applications it preinstalls on PCs. Compaq simply resells the software, much as a retail outlet would. The software is identical, but the support policies aren't. When you buy from Compaq, your options are the same as if you'd bought the application from the publisher (except you can call Compaq for support if you prefer). With Gateway, you're required to call the PC company for support.

So what's wrong with having to go to your PC maker for support? Consider these statistics: While 87 percent of callers to the software publishers in our survey rated their overall satisfaction as very or somewhat satisfied, the ratings of PC companies in our hardware service-and-reliability surveys are all over the map. And the average caller to the software companies waited on hold for 4 minutes. Our hardware survey suggests you could wait a lot longer.

Once you reach someone at your PC company, the technician may make an important distinction between "problem" support and "tutorial" support. For example, if you can't get Microsoft Office to work with your new Pentium, the Gateway technician will do everything possible to resolve the problem. If, on the other hand, you can't figure out what formula to use to repair the damage you've done to your boss's sales spreadsheet, you may be out of luck. Gateway will answer this type of tutorial question once; after that, they'll politely explain that they don't offer tutorial support and suggest you call the software publisher—and that call may be on your dime. Policies vary among PC companies on tutorial versus problem support.

CHANGES IN THE OFFING

Hardware and software companies are eager to make the software-bundling arrangement work. It helps software companies sell more products and gives PC makers one more tool to differentiate their machines and add value. For it to be viable, though, the quality of the software support offered by computer manufacturers needs to improve.

To assist PC makers in their support efforts, major software companies offer training and certification programs and make their support databases available to the technical support staffs at PC companies.

Meanwhile, hardware companies are evaluating their options: trying to balance customers' increased support demands with dwindling profit margins. According to Steve Smith, director of customer service delivery at Dell, "Obviously, if you offer lifetime toll-free technical support and your installed base continues to grow, you have to balance that somehow." No one wants to turn customers away; the question is who pays. Some PC companies already charge for software technical support—usually after a grace period. As we were completing this article, for example, Compaq and IBM announced they would begin charging for software support. Other PC firms are likely to follow suit.

Charging for support may be necessary if PC companies are to provide the support consumers expect—and become the one-stop shop for hardware and software. But if you're thinking of getting all your hardware, software, and support—at a bargain price—from your PC company, don't be too surprised if what's free when you sign on isn't free next year. —C. W.

JAMES YANG

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easier to access, not more expensive and harder to find," says Mason Woodbury, Broderbund's vice president of direct marketing. According to Woodbury, the only type of support the company would charge for is after-hours or accelerated service.

Other consumer software companies—including The Learning Company and Microsoft—agreed that home users simply won't pay for support and said they plan to continue free phone support and free online after-hours support for consumers. The Learning Company reluctantly switched from a toll-free line to a toll line, and that's as far as it was willing to go. Shary Fitzpatrick, director of corporate communications, told us technicians feared the kids would stop calling to talk to Reader Rabbit.

Although it's difficult to compare the quality of support between a company supporting complicated workplace applications and one supporting games and entertainment titles, our survey indicates that the service at consumer software companies rivals that of their business counterparts. Eighty percent of our readers were very satisfied with the support they received from these companies (Broderbund, Intuit, and The Learning Company).

Deborah Willingham, vice president of product support services at Microsoft, says the company's decision to offer free lifetime support on its business applications gives it an advantage in the home market. "We absolutely think it gives us a competitive advantage," explains Willingham. "Even more than business users, home users think about support options before they buy the product."

But one giant in the consumer software market wonders how long it can continue providing support for free. "Having one blanket [free] plan probably doesn't meet everybody's needs," says Anne French, senior product manager in Intuit's Pocket Quicken Group. "Some people don't want to wait for answers, and they will be willing to pay," she notes. However, she adds that the company currently has no plans to implement fee-based technical support.

Joe Jacoboni, president of independent support provider Software Support, sees the home user as an opportunity. Although software company representatives universally doubted the willingness of home users to pay for technical support, Jacoboni doesn't see a problem. "There are significant returns on computers," he explains. "Those people took the time to make a major purchase. Now they have to return it because they can't use it. How hard will it be to sell them support?"

Tomec Smith, the president of InfoCenter Market Research in Aurora, Colorado, paints a compelling picture of a future in which home PC users will be as important a part of the computer service market as the corporate customer is today: "When there is a server in the basement next to the dryer, then support for the home user will become important. The question is will it be Microsoft, TCI, or the Novell guy who comes in to do the service?"

TAKING ADVANTAGE OF FLUX

As the software industry becomes more about service and less about product features and price, companies will scramble to carve their own slice of the market. And other factions of the industry—resellers, for example—will want a piece of the action.

As a consumer, you'll see more and more options; most will have a price tag attached. It's too soon to tell whether these changes ultimately will be good for consumers, or to know which of today's players will still be in the support business next year. But gone are the days when getting an answer to a software question was a simple matter of picking up the phone.

Christina Wood is an associate editor for PC World.

Not-So-Random Call Generators

	Interoperability problem[1]	Question about a feature	Installation/ upgrade problem	Software bug
Lotus users	33%	28%	21%	5%
Microsoft users	37%	25%	35%	12%
WordPerfect users	21%	37%	21%	24%

Why call technical support? Many readers surveyed turned to Microsoft with interoperability problems; WordPerfect customers had the most bug-related questions.

[1]Includes network, operating system, and software interoperability.

Based on responses to PC World's November 1994 Software Technical Support Study.

The Telephone Rules

	Online	Fax	Automated voice response
Lotus users	14%	16%	1%
Microsoft users	23%	12%	4%
WordPerfect users	27%	9%	1%

Software companies thought charging for telephone support would send customers running to alternate means of support. But among the readers we surveyed, a relatively small percent have taken advantage of their vendors' high-tech options.

Based on responses to PC World's November 1994 Software Technical Support Study.

"Home users think about support before they buy the product," says Deborah Willingham, vice president of product support services at Microsoft.

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[ ]

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NO MORE MEETINGS?

Meetings are one of the necessary evils of business—give 'em an hour and they'll take over your workday—but what better way to exchange information among groups of people?

Electronic mail doesn't quite hack it. It works fine for one-on-one conversations, but in a group, the flurry of electronic carbon copies can lead to endless, often redundant exchanges in which the original intent gets lost among the digressions and switchbacks.

If this story sounds familiar to you, take heart: The emerging category of conferencing software promises a change for the better.

If you don't have time to do lunch or take a meeting, try conferencing software instead. Our reviewer compares five leading packages.

BY JIRI WEISS

Conquer Meetings, Tame Infoglut

We need meetings to exchange information and air ideas, but not all meetings have to be in person. Even conference calls and video teleconferencing are confined to real time (see "Video Conferencing: Coast to Coast and Face to Face," March 1995). Consider the costs of coordinating a live meeting—sifting through everyone's schedules, finding a place to meet, spending the time together—when all you really want to do is, say, distribute the preliminary budget for the next fiscal year and discuss your group's priorities. And if your meeting results in a call for further information, it spawns still more meetings.

Conferencing software imposes no time constraints, and it creates an online meeting place where you can start things off by posting a message with the budget spreadsheet attached. Your LAN (local area network) is the backbone of the operation; you become the moderator of the conference, granting access to all of the participants. They look at your spreadsheet and post their responses, either to your original message or to the comments of other participants.

As the discussion grows, conference members may post additional files with relevant information, and these, too, may collect responses. Postings can pile up quickly, but the software organizes these complex relationships into "threads" so they're easy to follow—even for someone who tunes in later. In some conferencing products, version tracking allows members to build a file together and keep tabs on all the changes.

As a project deadline nears, the moderator can review the contents of the conference to come to a decision alone, or can present a number of possibilities to the group for a communal decision. At the least, conferencing software can shorten a live meeting by giving attendees a chance to assemble and review materials beforehand. Conferencing software can also serve as a database of answers to customers' most frequently asked questions, or as the information center for project teams, committees, and task forces.

E-Mail Holds Its Ground

Conferencing software should lighten E-mail traffic, but it's not meant to replace it entirely; E-mail is still the best way to send notes to individuals. However, any projects that involve large groups and complicated issues and that require time to collect ideas and data will profit from the structure that conferencing software imposes.

As the software evolves, it is learning to work more smoothly with E-mail. Some of the products reviewed here already use E-mail for a few purposes, but vendors promise deeper and more-versatile integration in future versions—pooling strengths to make all your communications easier and more efficient (see the sidebar "On the Horizon").

PC World tested five promising Windows-based conferencing products: Collabra Software's Collabra Share, Lotus Development's Lotus Notes Express, Attachmate's OpenMind, Trax Softworks' TeamTalk, and ICL's TeamWare Forum. While this relatively new category has yet to establish a baseline feature set, these products all have some form of threaded discussions; different ways of showing, sharing, and collaborating on files over a network; and E-mail and remote capabilities (including compliance with VIM or MAPI messaging protocols). List prices range from $69.95 to $155 per user (the server software some products require is extra), so we weighed cost as well as quality.

Of the five applications we reviewed, only three—Collabra Share, OpenMind, and TeamTalk—focus exclusively on conferencing. Although TeamWare Forum is available as a stand-alone product, it forms an integral part of a complete office-automation package called TeamWare Office. Lotus Notes Express is a client module for Lotus Notes that includes discussion forums, among other capabilities.

What Makes a Conference Go?

The PC World Test Center took the five packages through their paces: joining a conference, reading and posting messages with attachments, and creating and moderating a conference. We repeated the same tests remotely on a mobile computer connected to the network via modem. Our LAN consisted of a file server running Novell NetWare 3.12—or, in the case of OpenMind, Windows NT Server—and workstations running Windows for Workgroups 3.11.

The basic format of conferencing software should be familiar to anyone who has used a bulletin board system (BBS), an online service, or an Internet news

BEST BUY

At $155 per user (in a setup for 100 users), not including server software, OpenMind is expensive, but it is also the best of the five contenders. Never mind that it requires a server running Windows NT; we liked OpenMind's elegant, easy-to-learn interface, which organizes postings in a scrollable outline combining the best elements of Collabra Share and TeamTalk, its two closest competitors.

Like Collabra Share, OpenMind makes the organization of conference messages evident at a glance, indenting and linking messages under the main topic. But while Collabra Share forces you to read postings one by one, OpenMind can display a whole thread at once (our favorite feature in TeamTalk as well). We also liked OpenMind's ability to perform full text searches in attached documents as well as in the text of messages (Collabra Share also has this capability).

group. All the products organize postings within conferences, with the moderator controlling access.

Within each conference, messages are arranged by topic. You may comment on the general topic being discussed, reply specifically to a particular posting, or start a new topic of your own. As discussion threads grow, conferencing software keeps track of postings by indenting responses underneath the original messages or drawing links between them. The moderator has the power to restrict membership and delete individual postings—or even the whole conference.

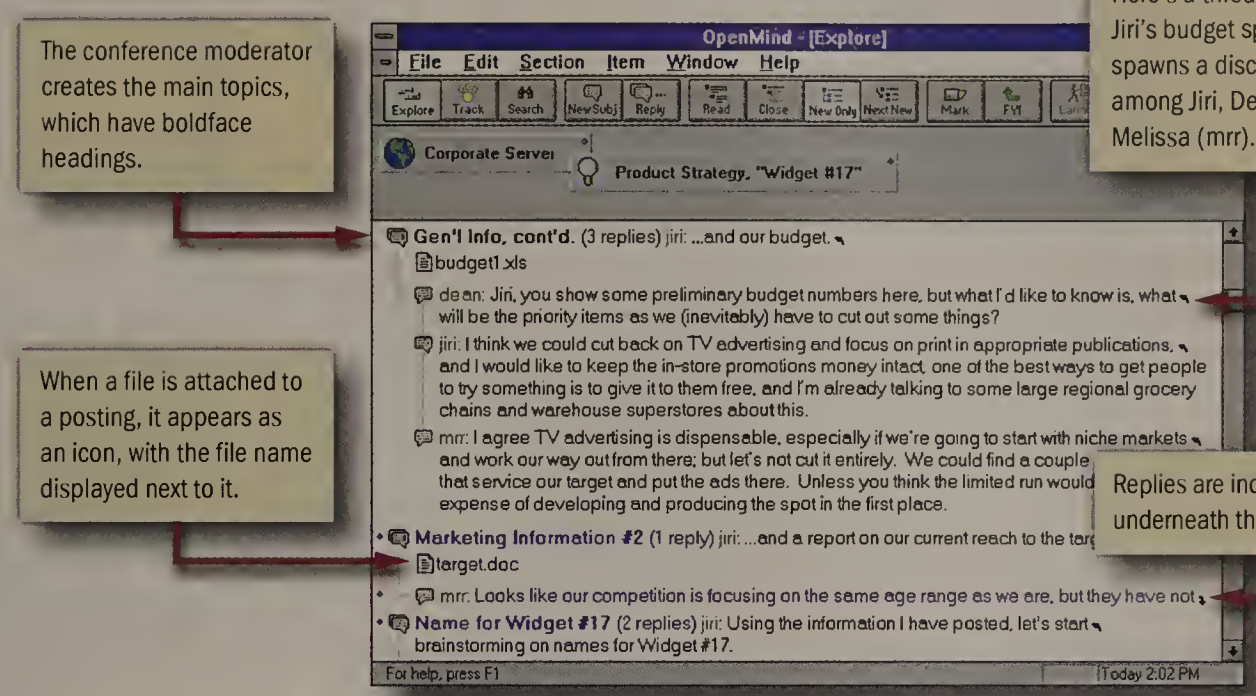
The five applications offer a wide variety of navigation tools. For example, you can choose to view only messages from selected conferences, or to see only messages from the last few days. Most of the applications also alert you to unread postings and keep track of those you've read. All the packages except TeamWare Forum index the full text of postings for comprehensive searching.

To share a file with the group, just attach the file to your posting. All the applications support some form of Object Linking and Embedding (OLE): Embedding makes the document an integral part of the message, while linking allows a whole group to collaborate on the attached document.

As for security, all the packages we tested allow password protection of the application itself. A few can add passwords and even encryption to individual conferences. The CIA would probably applaud Lotus Notes Express, which has an exhaustive set of security options—including encryption and password protection down to the level of individual documents.

CAN WE TALK?

Every discussion has a *thread*—the progress of the topic from introduction to end—but keeping track of the ins and outs, tangents, and conclusions can be a real challenge. The figure below illustrates conference threading at work in our Best Buy, Attachmate's OpenMind.



Conferencing That Goes Where You Go

Four of the packages can replicate conferences automatically to remote sites, opening up the possibility of enterprise-wide collaboration. Without replication, the employees working in a company's satellite offices would have to dial in to headquarters several times a day for the latest data. Replication enables a server to communicate regularly with its counterparts at far-flung company sites; Lotus Notes Express and Collabra Share even replicate conferences to individual PCs. If you're on the road, you just dial in occasionally so your computer can replicate new information.

These packages are all databases of a sort, but they use different methods for storing and sharing data. In Collabra Share and TeamTalk, individual workstations do most of the work; the files reside on the server until a workstation issues directions. On client/server applications like Lotus Notes Express, OpenMind, and TeamWare Forum, server software manages much of the processing. The NLM (NetWare-loadable module) version of Notes Express we tested requires a dedicated server. The client/server packages took more time to install, but they offered much better remote support—a sticky problem for the other packages.

Conferencing software remains a work in progress, in search of a common terminology, interface, and feature set. All too often, a program's quirks obstructed our efforts to communicate effectively. Some of the packages can't export the contents of a conference to another application, and this makes building a report difficult. We'd also like to see conferencing software designers add polling and voting—features already available in meeting-support software (see the sidebar "The Online Talk Show").

It might feel strange at first to shift a significant portion of your communications to conferencing software. You will lose the spontaneity and chemistry that's possible in live meetings, but you stand to gain much more when you move them online. Users we've interviewed claim that quieter colleagues tend to contribute more when they can air their ideas electronically. And conferencing software's role as an information center takes the organization and distribution of your staff's collective knowledge to a level that promises to transform the way you, your staff, and your company work together—for the better.

Jiri Weiss is a freelance technology writer based in Berkeley, California. Testing was performed in the PC World Test Center by Dean Andrews, Dave Casini, Melissa Riofrio, and Jiri Weiss. Test systems provided by Micron Computer and Zeos International.

Collabra Share 1.0

PROS: Inexpensive, powerful indexing and searching

CONS: Weak support for remote users, tedious method for adding conference users

We tested Collabra Share with Enterprise Extensions, another Collabra product that adds E-mail and replication capabilities. It's one of the least expensive packages reviewed here, and it's well regarded, having secured partnerships with Microsoft, Novell, and Banyan. We liked many things about Collabra Share, but some important features fell short of our expectations.

Collabra Share, from Collabra Software, displays all the available conferences—which it calls *forums*—as book icons in the "Library." A red flag on a book's cover indicates new or unread postings. The forum screen has three panes: The top left contains a list of categories in the forum, the top right maps the thread within a selected category, and the bottom displays a selected posting's contents. A star marks the unread messages to indicate that they're new. But you can read only one posting at a time—a tedious business when you want to review a whole thread. Collabra Share organizes threads by indenting replies under the original item. When you post a message, the Post & Notify button allows you to alert a coworker through E-mail.

Creating a forum is simple, but granting forum membership is not: Collabra Share doesn't let you select members for private forums. Users have to request membership; you either grant or deny the request, and there's no way to ensure the membership of key people. However, you can secure entry to the forum with a password or even encrypt its contents to thwart snoopers.

The software "agents" available in Enterprise Extensions provide two ways to use Collabra Share remotely, but both are cumbersome in practice. The Mail Agent lets you send forum postings as E-mail messages, but you are deprived of Collabra Share. On the other hand, you can load the full Collabra Share application on your notebook and have the Replication Agent synchronize your remote copy of the forum with the original; but it could involve more administration than the average user is willing to do.

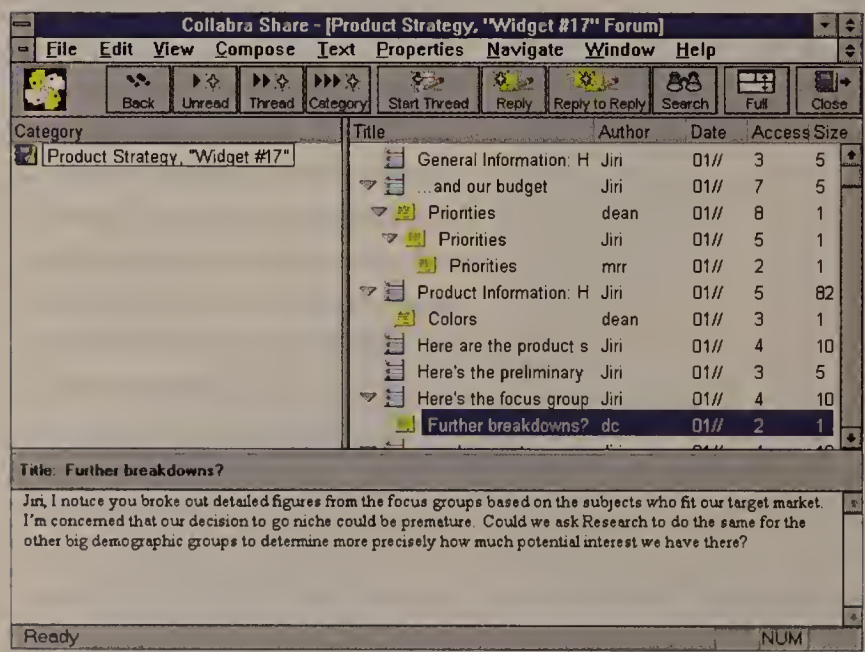
Version 1.0 of Collabra Share has some good points, but its lackluster remote support, as well as other clunky features, prevent it from being a Best Buy. However, version 2.0 of Collabra Share promises to remedy most of our complaints (see the sidebar "On the Horizon").

SYSTEM REQUIREMENTS: A 386-based PC or better, 4MB of RAM, Windows 3.1, and MS-DOS 3.1 or later version. Enterprise Extensions requires a separate server and a MAPI- or VIM-compliant E-mail system.

NETWORK: Any DOS-compatible network operating system, including Novell NetWare and Windows for Workgroups.

PRICING: $69.95 per user (for 100 users); $795 for 10 users; $895 for Enterprise Extensions. Collabra Software, 800/474-7427, 415/940-6400

Reader service no. 741



Collabra Share's right top panel displays the conference thread in an outline form; the message that's open displays at the bottom.

Lotus Notes Express 3.21

PROS: Less expensive than a full-blown Notes client, good support for remote users, multiple levels of security

CONS: Requires Lotus Notes

Lotus Notes, from Lotus Development, is the mother of all groupware, a program that gives companies the power to design applications addressing their particular needs. But not all companies, nor all company employees, need the full-powered Notes client at their desks.

Lotus Notes Express looks and works like Lotus Notes, but it's actually a Notes client program that runs from the Notes server and offers five basic workgroup applications: E-mail, conferencing, news databases, a reference library, and a phone book. If your company has invested in Lotus Notes, Notes Express is a bargain at $99 per user (for 100 users), compared with $275 for the full Notes client. But if all you need is conferencing, the investment is simply too steep. You still have to buy the Notes server and at least one full Notes client, which means you also need a network administrator—preferably a Notes VAR—and this could cost plenty. We used the NLM version of Notes, which requires a dedicated server with 24MB of RAM and a 300MB hard drive.

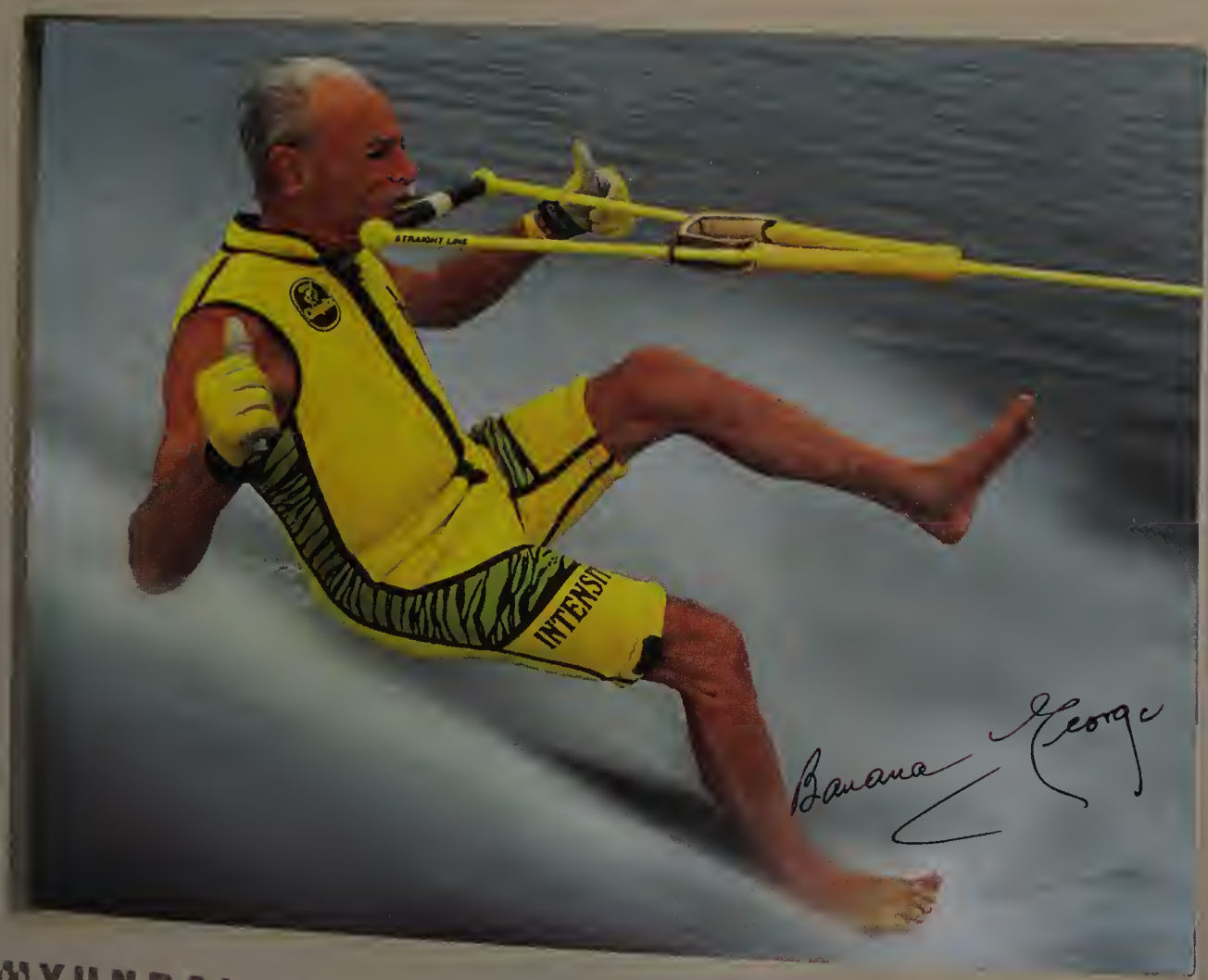
Notes Express indents responses under the original message. The process of posting to a conference—in Express it's called a *database*—is easy, if a little unusual; instead of clicking a Post or an OK button, you file an item using a tool bar button on the main menu.

The program's search utilities are the most sophisticated we saw. Express indexes embedded (but not

SYSTEM REQUIREMENTS: Client: A 386-based PC or better running Windows 3.1 or OS/2 with Presentation Manager. 6MB or more of RAM is recommended, a minimum 40MB of available hard disk space is required. NetWare-loadable module (NLM) server: a dedicated Novell server with a minimum of 24MB of RAM and 300MB of hard disk space.

PRICING: Lotus Notes Express $99 per user (for 100 users); full Notes client (for administration) $275; server $275. Lotus Development Corp., 800/346-1305, 617/577-8500

Reader service no. 742



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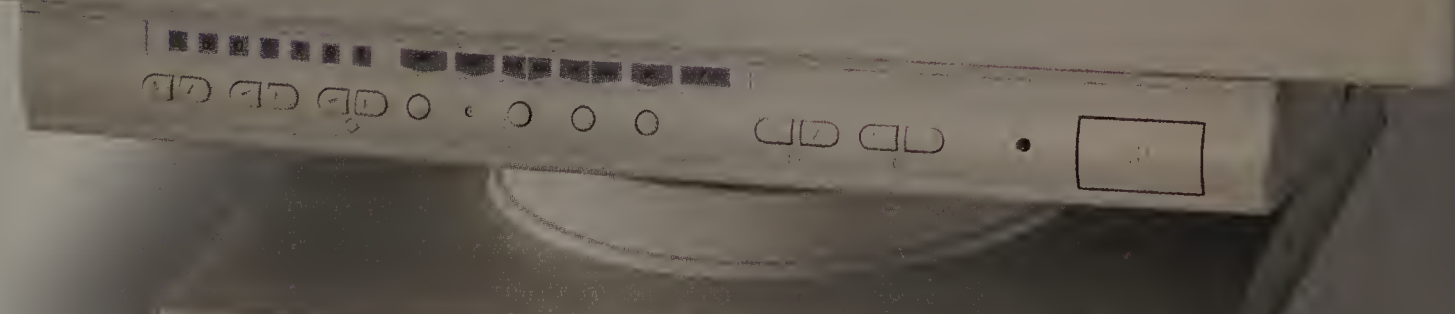

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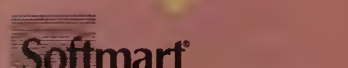

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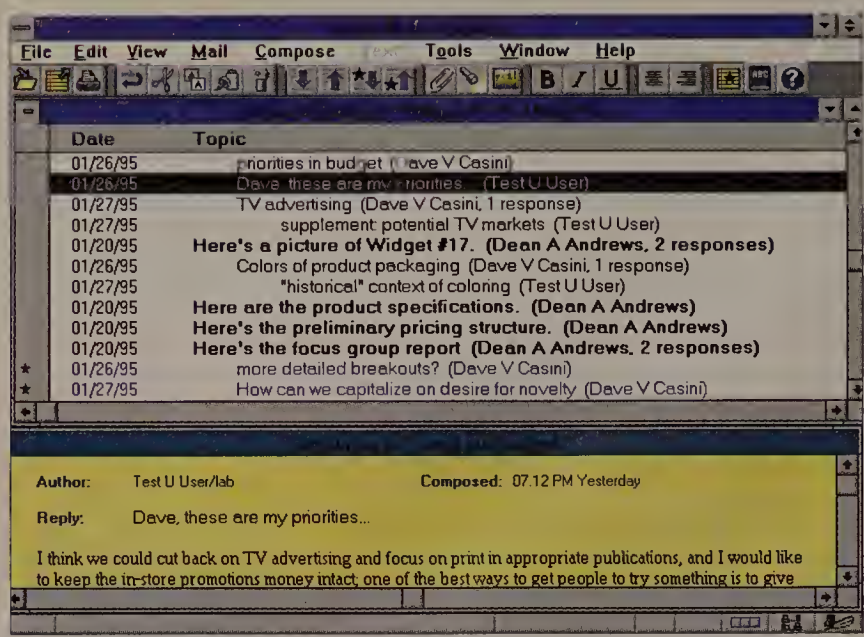

Two views of Lotus Notes Express: In the top window, the discussion thread—note that new messages display in a different color and are marked with a star—and in the window below, the text of a message.

attached) files, effectively building a large text database of postings and documents for fast searches. If you are unfamiliar with creating complex Boolean searches—for example, retrieving comments made by Jones that have the word *budget* in the text—Express helps you compose them. You can use the sophisticated Query Builder to eliminate certain documents from the search.

Administrators in large companies should like Lotus Notes Express's multiple levels of security. You can restrict access to the database and encrypt its contents. Express, like Collabra Share, replicates databases to individual machines for easy remote use.

Lotus Notes Express's discussion database application offers a sophisticated and capable tool for conferencing, and its suite of five basic Notes applications serves as an easily digestible portion of a formidable groupware product. But, perhaps symbolic of Express's role as a mere side dish for the main entrée, the manuals and online documentation pay more attention to Notes than to Express. At one point during our tests when online help led us astray, our support technician at Lotus could not determine whether we were running Express or full-blown Notes. So don't bite off more than you can chew, and don't consider Express unless you already have Notes.

OpenMind 1.0

PROS: Exceptionally well organized and easy to use, indexes attached documents and messages for easy searches

CONS: Expensive, requires a Windows NT server, remote users cannot work off line

Attachmate's OpenMind is easy to use from the start. A slide-show tutorial covers the basics, and context-sensitive help does the rest.

OpenMind's screen is divided into two parts (see "Can We Talk?" for an example of how it looks). The top section shows the name of the current conference, and all other available ones, as rectangular icons. The bottom part displays discussion threads in a scrollable format that's second only to TeamTalk's in accessibility.

SYSTEM REQUIREMENTS: Server: Microsoft NT Server. Network: IPX/SPX, NETBEUI, TCP/IP, NETBIOS, AppleTalk.

CLIENT: Windows 3.1. Future support for Macintosh.

PRICING: $155 per user (for 100 users) to $175 (for one user); $995 for server. Attachmate Corp., 800/348-3221, 404/475-8380

Reader service no. 743

The program's threading method resembles that of a word processor's outliner: Each new topic becomes a main entry in the outline, labeled with the subject and the creator's name. The comments of other participants are indented underneath, and connecting branches indicate relationships between postings.

OpenMind displays only the first line of each posting—in outliner terminology, the collapsed view. Double-click on any collapsed item to display the full contents.

When you write a posting—OpenMind calls it a reply—a dialog box appears. In the top section you write your message; in the bottom you can display the original message. None of the other products that we reviewed had this feature. In the Reply screen you can also check your spelling or send a special FYI note to alert specific conference participants of your posting. If you attach a document to a message, OpenMind indexes the document along with the message text, so you can search comprehensively on the contents of both the attachment and the posting.

OpenMind is unique in how it facilitates workgroup collaboration. Instead of trading files back and forth, you just drop a document into a shared space called a folder. When another team member changes the

ON THE HORIZON

Many of the conferencing packages we tested in this review are due for upgrades this year. Integration—with E-mail as well as other applications—seems to be the buzzword for the new generation. Here's what we know so far.

Our Best Buy, Attachmate's OpenMind, announced version 2.0 earlier this year. The upgrade promises greater E-mail integration, as well as access to the Internet and the World Wide Web.

Collabra Share 2.0, due to ship by the fall, will have a significant number of new and improved features. Based on what we've seen of the beta version, Collabra Share 2.0 has addressed many complaints about the earlier version. The member registration process is no longer so convoluted, and remote users should have full access to Collabra Share if their organization uses the new client/server installation. The new version should also allow more integration with your company's E-mail system. Collabra Share 2.0 finally looks like an able contender with OpenMind.

Trax Softworks plans to ship TeamTalk version 2.0 in the first quarter of this year, adding topical threading, more navigation tools, and greater security. Closer to press time, we also expect to see an interim upgrade that should simplify remote use.

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Automatic add/delete shapes	★		
Automatic line crossovers	★		
Data fields	★		
OLE 2.0 automation	★	★	
Royalty free flowchart viewer (ABC Viewer™)	★		
Statistical Process Control Charting (ABC DataAnalyzer™)	★		
21 pre-defined diagram templates (ABC SnapGraphics™)	★		

And those are just a few of the features we've added to make your life easier. Right now you can get ABC Flowcharter 4.0 for as little as $99.95 upgrade. And you can upgrade from any business graphics program you already own. No other program gives you such complete power for so little. If you want to settle for less, it's your business. Contact your favorite reseller or call **1-800-775-6131.**

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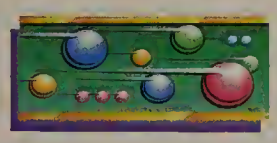

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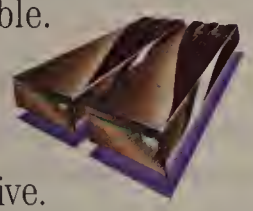

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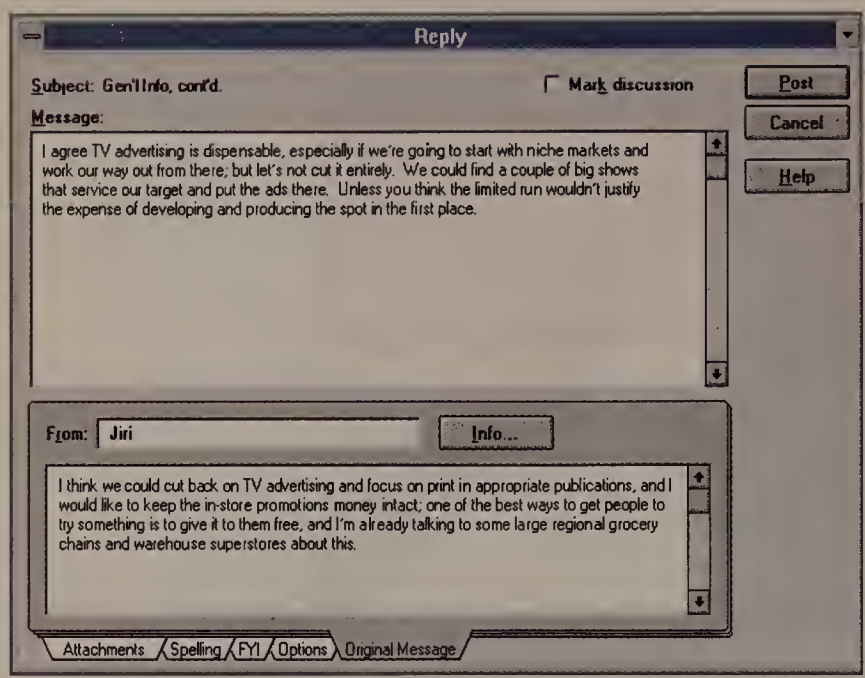

OpenMind's versatile Reply screen allows you to display the original message, send an E-mail, or check your spelling.

document, OpenMind automatically creates and numbers a new version. Your group can even attach discussions to specific versions. OpenMind also provides file viewers so colleagues can read your documents even if they don't have the same apps. If your work involves creating large, complex documents in collaboration, this feature could ease the burden of managing such projects.

OpenMind has three different ways you can look at a conference; these are called *views*, and all have the same outliner interface. The default Explore view is where you create and read discussions. The Track view shows only those conferences which you or a coworker have marked. In the Search view you enjoy the benefits of OpenMind's full text indexing of postings and attachments as you search for word matches across multiple conferences. Matching terms are highlighted in your search results, and you can reply to an item without leaving the Search view.

On the road, you'll find that OpenMind behaves just the same way over a 9600-bps modem as it does on a LAN. Since you must remain connected to work in the application, however, you could ring up a whopping phone bill. OpenMind's lack of replication is our sole reservation regarding an otherwise strong product. It's also the most expensive of the programs we reviewed. But until its competitors' features catch up with OpenMind's easy-to-use interface and versatile capabilities, it's still our Best Buy, hands down.

TeamTalk 1.1

PROS: Inexpensive; easiest installation; easy-to-read, scrollable format

CONS: No topical threading, limitations to remote access

TeamTalk's scrollable conference format is easy to read. It's also one of the least expensive products we reviewed. However, beyond a certain point Trax Softwork's product cannot compete with the features and capabilities of the client/server conferencing packages reviewed here.

TeamTalk presents conferences—the term it uses is *topics*—either as square icons or in gallery view, a hokey alternative interface in which topics are displayed as doors along hallways decorated with a water cooler or a potted plant. A scrollable conversation

THE ONLINE TALK SHOW

Conferencing applications represent just one aspect of the burgeoning market for group communications. Related products include The Mesa Group's Mesa Conference Plus, a Microsoft Mail add-on that provides the kind of integration we would like to see between conferencing and E-mail. With this program, turning an E-mail message into a conference posting is as easy as dragging it from the in-box to the conferencing window.

Some vendors of bulletin board systems (BBSs) have made their packages just as easy to use on a corporate LAN and added full-blown clients comparable to the Interfaces conferencing packages offer. BBSs may conjure up images of hobbyists with terminal-emulation programs dialing in over low-speed modems, but two consulting firms, KPMG Peat Marwick and Booz Allen & Hamilton, have standardized on FirstClass, a group communications product from SoftArc. FirstClass doesn't offer full text indexing or elegant threading, but it does match conferencing packages in other areas (even in database replication), and the price is right. SoftArc makes its client available for free, so KPMG's price per seat for the server is about $20.

Up to now, the FirstClass server resided exclusively on the Mac (although it had a Windows client as well), but SoftArc is developing a Windows version of the server software, due in the second quarter. And Galacticom, another BBS vendor, will ship a souped-up BBS, code-named Project Victory, this spring.

If you want a highly structured approach to conferencing, the Meeting Room from Eden Systems turns conferences into agenda items and permits much tighter control over discussions. Moderators can open and close agenda items, see who has participated recently, assign tasks to participants, and ask them to vote. The Meeting Room automatically tallies and graphs the results of electronic votes and surveys.

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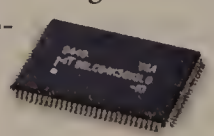

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intel inside pentium

Higher Score Represents Better Performance	WINSTONE 95 (Score)
MICRON P100 MILLENNIA	177
Dell Dimension XPS P100	150
Gateway 2000 P5-100XL	145
HP Vectra XU5/100C	16[illegible]
IBM PC 750-P100	163

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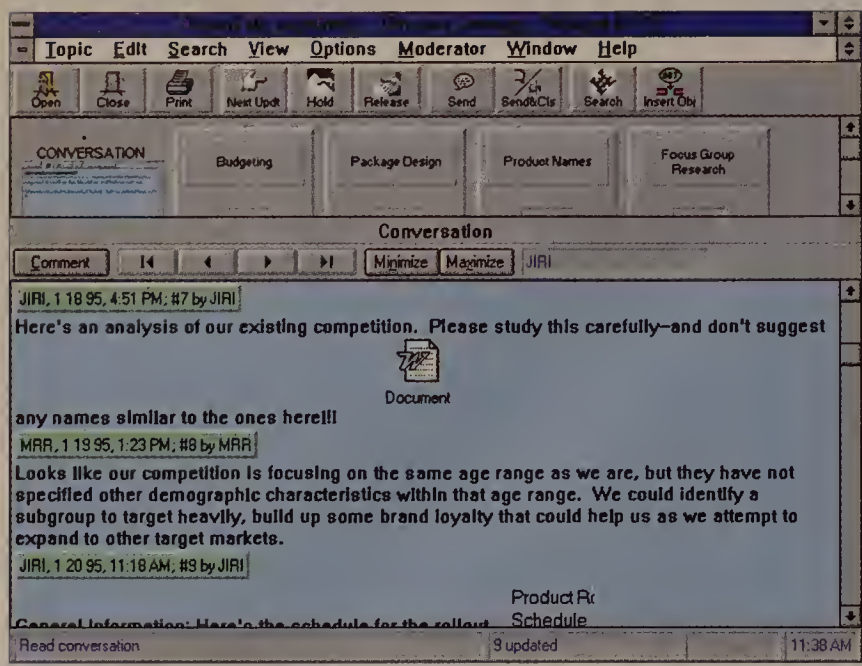


In TeamTalk, messages are arranged chronologically; you create subtopics (shown at the top of the screen) to organize the various aspects of a discussion.

window in each topic shows the full text of postings. Adding a comment is easy, and you can paste any number of *stickers*—icons that show a happy or morose face, a red devil, or the word *rush* in bold letters—into your message.

When you attach a document, either its first page or a program icon displays within the message; if you create a link to the file, the posted version reflects any changes you make to that file. When you post a comment, the workstation of every conference member beeps in acknowledgment. (You can disable this potentially annoying feature.)

SYSTEM REQUIREMENTS: Any PC running Windows 3.1, Windows NT, or OS/2 with at least 4MB of RAM. Runs on any network that supports file sharing, including NetWare, Windows for Workgroups, DEC Pathworks, Banyan VINES, and Artisoft LANtastic.

PRICING: $61 to $79 per user (depending on number of users). Trax Softworks, Inc., 800/367-8729, 310/649-5800

Reader service no. 745

TeamTalk's organization works better in theory than in practice; as your conferences get more complicated, so does the program. Messages are listed in chronological order, so TeamTalk's version of threading relies on setting up lots of subtopics. A topic on company benefits, for example, might have subtopics on medical, dental, and life insurance; retirement plans; and so on, and then it might contain layers of subtopics on different providers and their plans. Since the program doesn't distinguish between levels, you can get lost in the maze.

The package installed easily on our LAN, but remote connection was a hassle. TeamTalk uses E-mail to communicate with mobile users; its Postmaster software and a dedicated workstation handle the traffic. With Postmaster, you get the same TeamTalk interface, but you don't get the same functionality: Postmaster handles only messages for topics that already exist on both the local and remote machines, so offsite users must coordinate with the home office in setting up new topics.

Like Collabra Share, TeamTalk starts out with a good interface, but the program stumbles on remote use and exhibits too many quirks to earn a Best Buy. A new version that Trax planned to ship in the first quarter shows greater promise (see "On the Horizon").

TeamWare Forum 3.0

PROS: Inexpensive, integrates into a full-blown office automation package

CONS: Lack of full text indexing limits searches, program has quirky interface

At $170 for the server software and $890 for ten users, International Computers Limited's TeamWare Forum is the least expensive client/server application in our review. But it's just one of the five applications that comprise TeamWare Office, an office-automation package that includes scheduling, work-flow tracking, a shared library, and an E-mail application whose level of integration with the program approaches our ideal. Chances are you will buy TeamWare Forum as part of this whole ensemble.

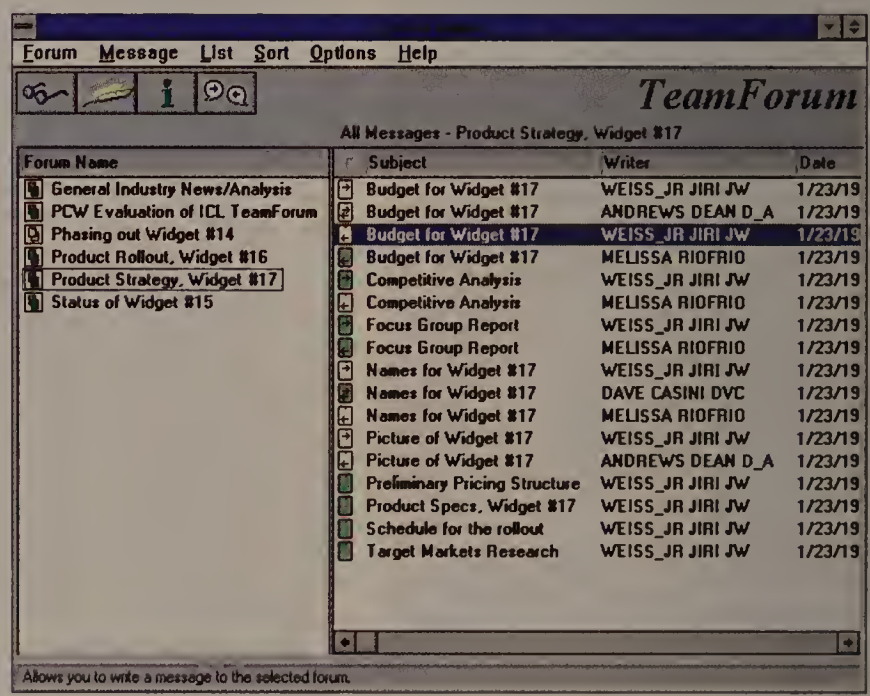
SYSTEM REQUIREMENTS: Client: a 386 PC or better with 4MB of RAM and 4MB of free disk space, running Windows 3.1 or Windows NT. Server: OS/2, Windows NT, UNIX, NetWare, or Solaris.

PRICING: Client $89 per user (for 10 users); server $170. International Computers Limited (ICL) TeamWare Division, 800/240-8326, 408/982-3026

Reader service no. 744

An import from Europe, TeamWare Forum has an interface with a je-ne-sais-quoi feel that sometimes puzzled us. A quill pen, for example, appears on the button you use to write postings to conferences—the term used here is *forums*. And after some head-scratching, we realized that the mystery icon with the ellipsis is the Prompt button, which brings up lists of options in dialog boxes.

TeamWare Forum divides the screen vertically into two windows. The left window shows the available forums; the right win-



TeamWare Forum (formerly called TeamForum) has a default conferencing display that sorts messages by date, but you can sort them by author or by subject (as shown here) to follow a thread.

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Human error, computer viruses or network crashes can quickly destroy months of work. That's the real world. And, if your data is worth saving, it's worth protecting. Conner makes it easy with new, powerful, high-capacity, cost-effective data protection. Introducing the Tape•Stor 420, Tape•Stor 850, and Tape•Stor 1700. Today's most advanced tape backup solutions for high capacity disk drives.

	Tape•Stor 420	Tape•Stor 850	Tape•Stor 1700
Compressed Capacity*	420 MB with Sony QIC-Wide media	850 MB with Sony QIC-Wide media	1.7 GB with Son QIC-Wide media
Format	QIC 80 & AccuTrak 250	QIC 3010	QIC 3020 & QIC 3010
Read Compatible	QIC 80/40 & AccuTrak 250/120	QIC 3010/80/40 & AccuTrak 250/120	QIC 3020/3010/80/40 & AccuTrak 250/120
Models	Internal floppy and external parallel port	Internal floppy and external parallel port	Internal floppy (high-speed 2 Mb/sec.)**
MTBF ***	100,000 Power on Hours	100,000 Power on Hours	100,000 Power on Hours
Warranty	2 years	2 years	2 years
Software included	Backup Exec for DOS and Windows	Backup Exec for DOS and Windows	Backup Exec for DOS and Windows

* All capacities assume software data compression of 2:1 ** Tape•Stor 1700 also includes a 2 Mb/sec. floppy interface card
*** 80,000 Power on Hours for external models

Now you can protect your entire disk drive with a single minicartridge tape. So you can backup 420 MB, 850 MB, or 1.7 GB of data without switching cartridges. And, Tape•Stor systems are complete with all the hardware and documentation you need. Plus, Tape•Stor comes bundled with Backup Exec™ software to backup DOS and Windows files plus the files stored on your Novell network—right from your desktop. We've even included a free Sony QIC-Wide™ minicartridge tape to get you started.

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1.7 GB Capacity

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The Storage Answer.

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Circle 59 on reader service card

dow lists the postings located in a forum, showing subject, writer, and date. You can display postings in chronological order (the default) or by subject or writer. To see the thread related to a particular message, you click on another mystery icon, this one showing two dialog balloons, like those you would see in a comic strip.

A more serious problem than its odd interface, though, is TeamWare Forum's lack of full text indexing. The only way to search forums is by date range or author, or by using a keyword classification system the administrator must establish—a needless hassle.

TeamWare Forum is a decent product that deserves a better set of documentation. The "Getting Started" guide is informative but apparently outdated—the program as shown in the illustrations looked different from the version that we tested. The online help can be vague, and the program's designer went hypertext happy, creating a complicated web of links: The explanation of a simple procedure often requires you to jump through several pages of notes. Complications such as these prevent us from wholeheartedly recommending TeamWare Forum.

BETTER COMMUNICATION, FEWER MEETINGS

● = Yes ○ = No n/a = not applicable

	Collabra Share 1.0	Lotus Notes Express 3.21	OpenMind 1.0	TeamTalk 1.1	TeamWare Forum 3.0
Pricing					
Price per user [1]	$69.95 [2,3]	$99 [2]	$155 [2]	$79 [4]	$89 [4]
Price for server application [1]	n/a	$275 [5]	$995	n/a	$170
Moderator rights					
Add and delete members	●	●	●	●	●
Restrict access	●	●	●	●	●
Delete postings	●	●	●	●	●
Delete conferences	●	●	●	●	●
Notify new members	●	●	●	●	○
Create multiple moderators	●	●	●	○	○
Member rights					
Create topics	●	●	●	●	●
Anonymous posting	●	○	●	●	●
Delete own postings	●	●	●	○	●
View original posting during reply	○	○	●	●	○
Searching and filtering					
By author	○	●	●	●	●
By date	○	●	●	●	●
By keyword or subject	●	●	●	●	●
Search multiple conferences	○	●	●	●	●
Full text indexing of postings/attached files	●/●	●/○ [6]	●/●	●/○	○/○
Relevancy ranking of search results	●	●	○	○	○
View new topics only	●	●	●	●	●
View marked items only	○	○	●	○	●
Export to other applications	●	●	●	○	○
E-mail integration					
VIM/MAPI compliant	●/●	●/○	●/●	●/●	●/●
Proprietary E-mail system	○	●	○	○	● [7]
Security					
Application password	●	●	●	●	●
Conference password	●	●	○	○	○
Posting password	○	●	○	○	○
Encryption	●	●	○	●	○
Remote capabilities					
Full access to features	○	●	●	○	●
Replication to remote sites	●	●	○	●	●

BEST BUY

[1] Vendor estimates.
[2] For 100 users.
[3] Remote use requires $895 Enterprise Extensions.
[4] For 10 users.
[5] Also requires $275 full Notes client.
[6] Indexes embedded files but not attached files.
[7] TeamMail add-on available.

For more information about all products in this table, circle reader service no. 905.

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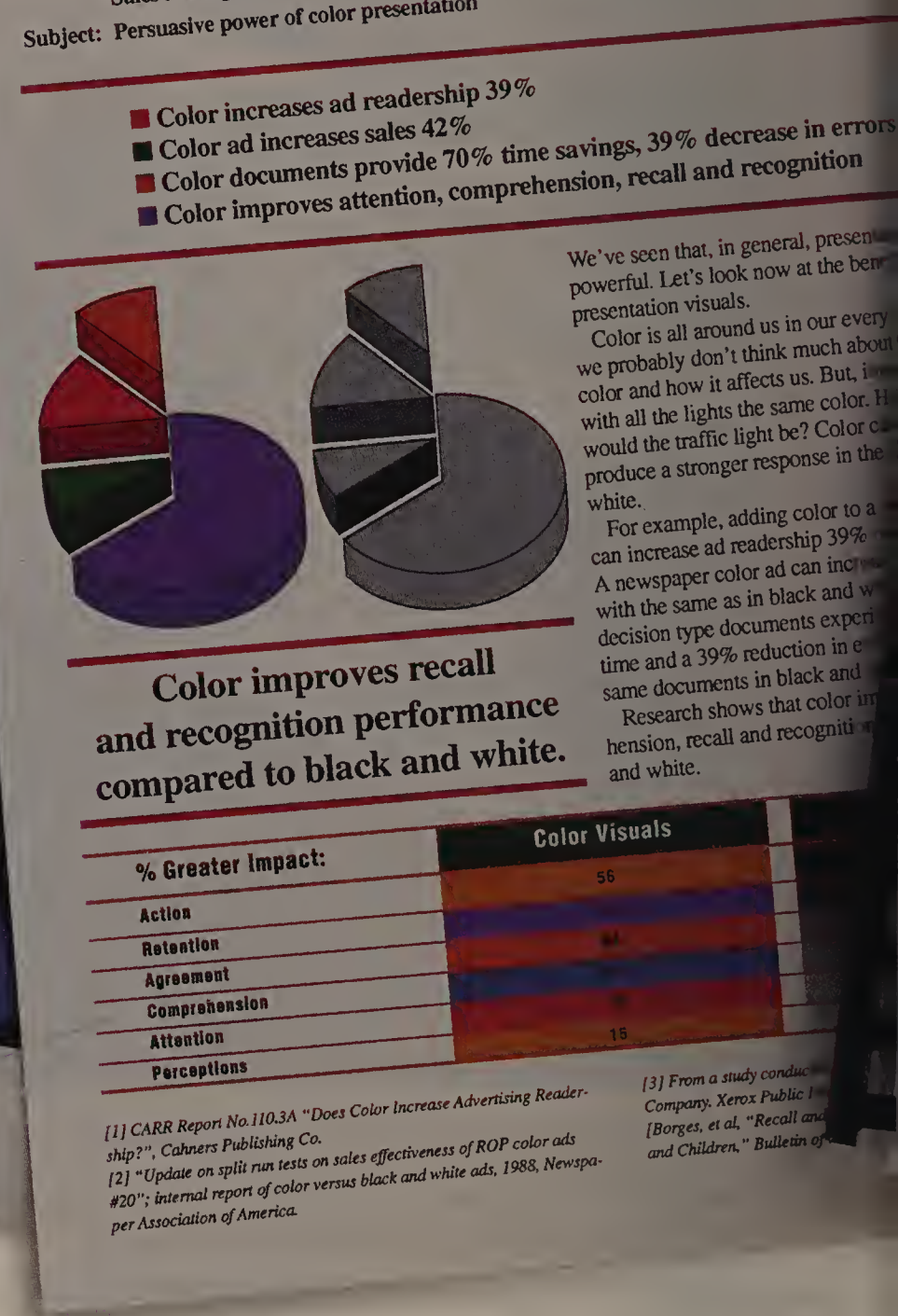

Sales-O-Gram

To: All Sales Representatives
From: Kenton O'Keefe
Sales Manager
Subject: Persuasive power of color presentation

- Color increases ad readership 39%
- Color ad increases sales 42%
- Color documents provide 70% time savings, 39% decrease in errors
- Color improves attention, comprehension, recall and recognition

Color improves recall and recognition performance compared to black and white.

We've seen that, in general, presen powerful. Let's look now at the ben presentation visuals.

Color is all around us in our every we probably don't think much about color and how it affects us. But, i with all the lights the same color. H would the traffic light be? Color c produce a stronger response in the white.

For example, adding color to a can increase ad readership 39% A newspaper color ad can inc with the same as in black and w decision type documents experi time and a 39% reduction in e same documents in black and

Research shows that color im hension, recall and recogniti and white.

% Greater Impact:	Color Visuals
Action	56
Retention	[illegible]
Agreement	[illegible]
Comprehension	[illegible]
Attention	15
Perceptions	

[1] CARR Report No.110.3A "Does Color Increase Advertising Readership?", Cahners Publishing Co.
[2] "Update on split run tests on sales effectiveness of ROP color ads #20"; internal report of color versus black and white ads, 1988, Newspaper Association of America.
[3] From a study conduc Company. Xerox Public I [Borges, et al, "Recall and and Children," Bulletin of

Text and spreadsheets can be printed from PCs, Macs and workstations. Or connect directly to virtually any network.

Color is color, unless it's

It's the business printer you've been waiting for. Office color that's so easy to use, reliable, and inexpensive, it's a practical office tool. It's the new Tektronix Phaser™340 color printer.

Speed? It's the world's fastest color printer at 4 color pages per minute. Cost? Full text pages on plain paper at 3¢ each. Color pages for 12¢ on your office paper. Simplicity? If you can load a stapler, you've mastered

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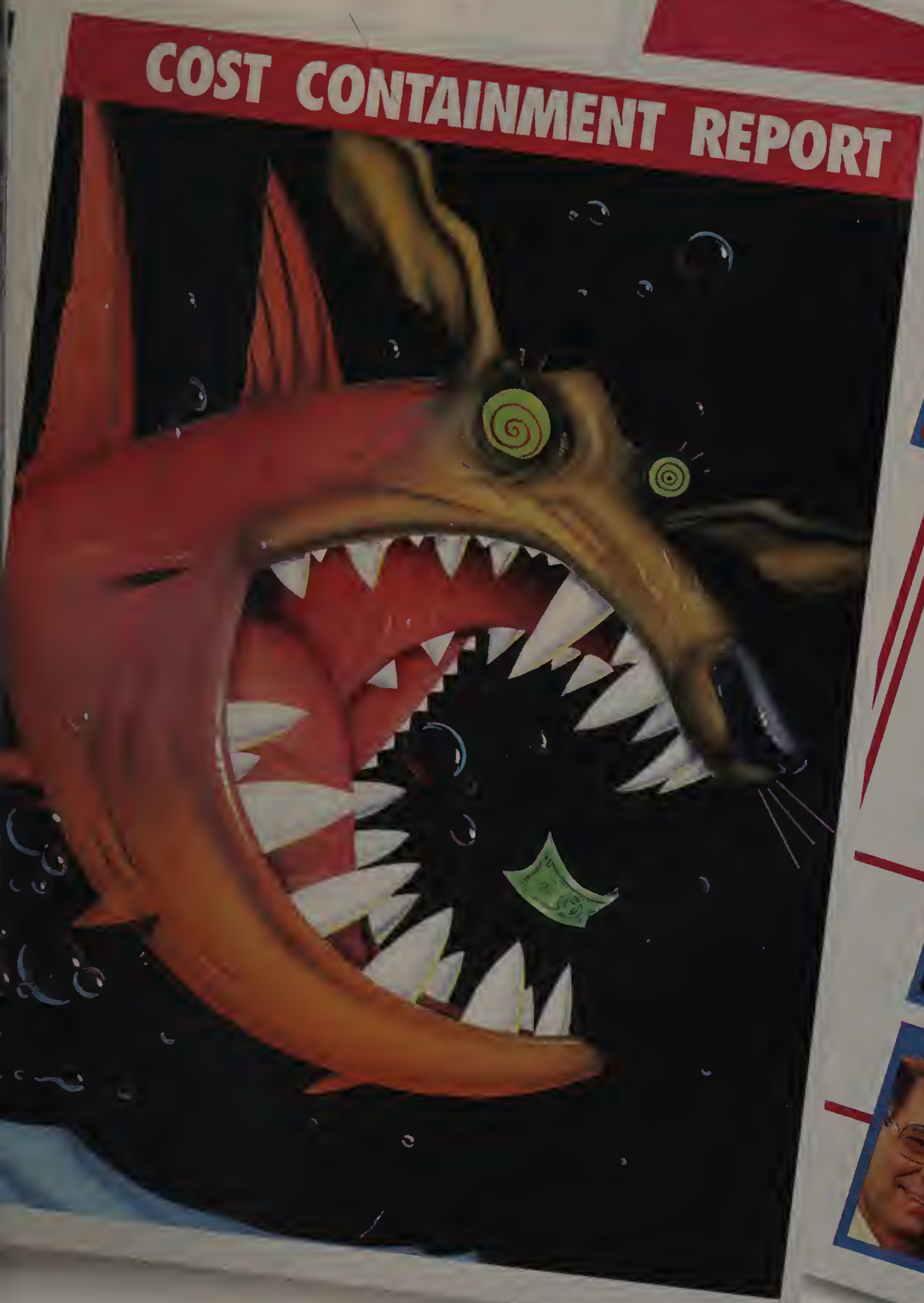
Print vibrant, high-end color on office papers for less cost per page than low-end color. They'll snap to attention.

Connect faces and places with photorealistic quality. Welcome to the world of practical color!



brilliantly practical.

this machine. Reliability? Add 750 sheets of paper and let it run overnight. Now, that's robust. Cost? At $4,995 there's nothing in its performance range that even comes close. Best of all, it's from Tektronix, a Fortune 500 leader, that's been making world-class color printers for 13 years. **The Phaser 340 Color Printer. So practical, it's brilliant.**

Tektronix

Circle 124 on reader service card

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TOP 20 PCs

100-MHz

LOOKING TO TAKE A PC FOR A TEST DRIVE? Strap yourself in and hop on the PC-bahn—desktops and notebooks by the dozen are hitting triple-digit speeds and not looking back. All across the PC spectrum, from power desktops to budget notebooks, systems are pegging the meter at 100 MHz. Pentium-100s are winning power desktop Best Buys, while DX4-100s are showing up strong in budget desktops and power notebooks. The new DX4-100 CPU from AMD and the Intel DX4-100 are appearing in affordable desktops running as fast as or even faster than some Pentium-60s and -75s.

100-MHZ COMPUTERS ALL AROUND: Clockwise from top left are the DFI Diamond P100, Dell OptiPlex XMT 5100, Polywell Poly 486-100VP4, and Micro Express MicroFlex-VL/104.

STAN MUSILEK

FACE-OFF

From high-end systems to budget desktops and notebooks, new PCs with 100-MHz processors from Intel and AMD make their move on the Top 20 charts.

By Bryan Hastings and Michael Desmond

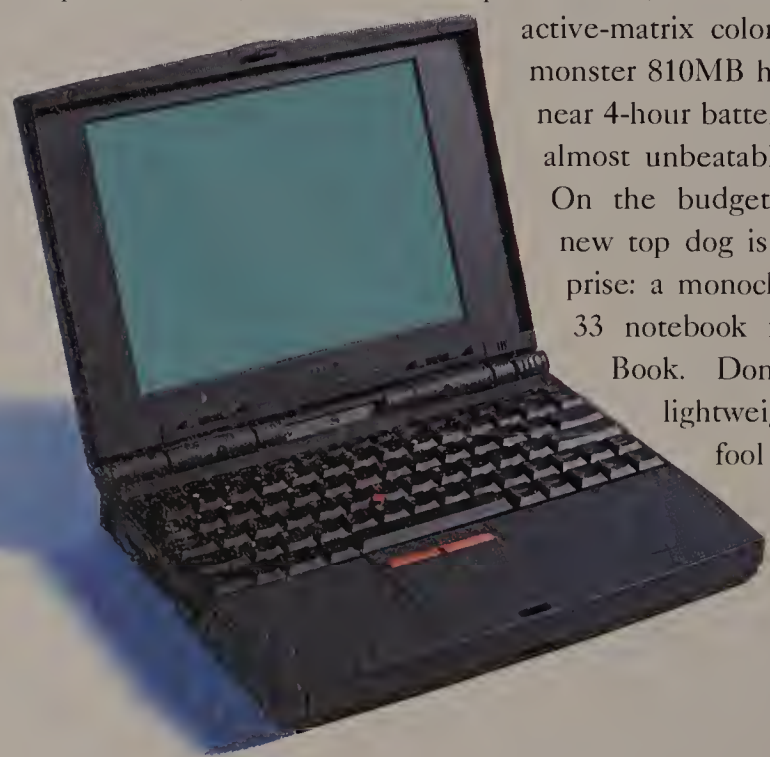
THE TOP 20

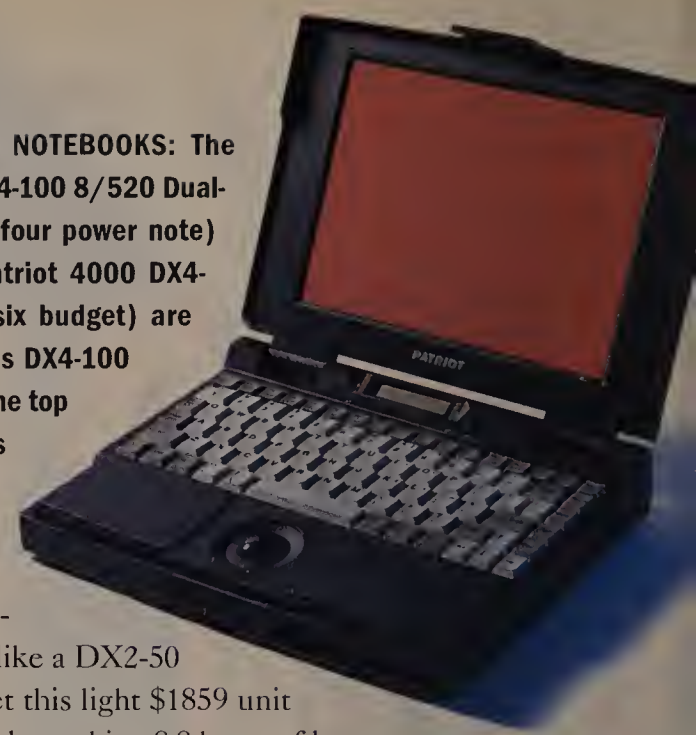
POWER DESKTOPS page 186
BUDGET DESKTOPS page 192
NOTEBOOKS page 206

PCs based on AMD's chips made an outstanding showing in the budget desktops category this month; three of the five Best Buys use CPUs from this Intel rival.

In the power desktops category, Dell's Dimension XPS P90 is back at number one. This PC is the enhanced version of the unit we reviewed last July, which enjoyed a spectacular seven-month run at the top of the Power Desktops Top 20. This model dropped from the list in February because Dell made some changes to it, necessitating a retest. The revamped XPS P90 resurfaced in the March roundup, and an aggressive $300 price drop has put it back in the top spot. An exceptionally reasonable $3363 buys one of the most robust power desktops you can find: It offers great Pentium-90 performance, plenty of expandability, and a rich feature set, including a 1GB hard disk, 16MB of RAM, and a triple-speed CD-ROM drive, all backed by Dell's excellent support.

For budget desktops, the spotlight turns to another Dell Dimension, the XPS P75, reviewed in March. This Pentium-75 minitower is a phenomenal amount of PC for $2213: You get a 560MB hard disk, a 15-inch monitor, a double-speed CD-ROM drive, and, of course, the same stellar support that backs Dell's power desktops. In the power notebooks category, Toshiba's T4900CT retains the top spot for the third month in a row. Its price is—take a seat, please—a budget-busting $7459. But the T4900CT is *the* total power totable, with Pentium-75 performance, a brilliant 10.4-inch active-matrix color screen, a monster 810MB hard disk, a near 4-hour battery life, and almost unbeatable support. On the budget side, the new top dog is a big surprise: a monochrome SX-33 notebook from WinBook. Don't let its lightweight CPU fool you—the WinBook XP SX-33 Monochrome acted like a DX2-50 in our tests, yet this light $1859 unit yielded a record-smashing 8.8 hours of battery life. In short, this is an excellent time to buy a new system.





NEW 100-MHZ NOTEBOOKS: The WinBook XP DX4-100 8/520 Dual-Scan (number four power note) and Acom's Patriot 4000 DX4-100 (number six budget) are based on Intel's DX4-100 CPU. Three of the top ten power notes use this chip.

This month system prices fell more than usual, which comes as no surprise since Intel, the 900-pound gorilla of CPU makers, just announced major price drops on its Pentium CPUs. In turn, three of the top notebook vendors, Compaq, Dell, and IBM, slashed prices by up to 20 percent on some of their portables. Desktop price drops were less dramatic, but there was a flurry of component upgrades, including larger hard disk capacities, higher-speed CD-ROM drives, and quicker fax-modems—340MB hard disks and 14.4-kbps fax-modems are fast becoming entry-level components. What can you expect next? Check out our sneak previews of 120-MHz computers from several major vendors in this month's *Top of the News*.

How the Top 20s Help You Find the Right PC

Our monthly roundup of desktops and notebooks helps even the terminally technophobic quickly choose the best system for their needs. We examine all the aspects of a PC—performance, feature set, upgradability, reliability, and support—and compare the system not only to the other computers reviewed this month, but also to all the systems we've reviewed in the past ten months that are still on the market. We call vendors to get the latest prices for all the desktops and notebooks previously reviewed, and we note any configuration changes. Our databases have swelled to more than 300 PCs—meaning we come up with the best of all the PCs out there. The Top 20s are the only source you need to make a fully informed buying decision.

Bryan Hastings and Michael Desmond are associate editors for PC World. *They can be reached on PC World Online (see page 12 for contact information).* PC World *staff members John Goddard, Anita Hamilton, Arden Hoffman, Owen Linderholm, Rick Overton, and Melissa Riofrio, and freelancers Geoffrey Coffey and Valerie Singer, contributed to this article. Testing by Dave Casini, Ulrike Diehlmann, Susan Silvins, and Kirk Steers; research and support by Mike Salayko.*

Call 800/434-4495 (for payment by Visa or MasterCard) or 900/993-2972 (for telephone billing) to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95). Touch-tone telephone required.

For more information about all products in this article, circle reader service no. 906.

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IntelDX4/100; 9.4" TFT Active Matrix color display; 8 Mb RAM; 340 Mb hard disk drive.

intel inside

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THE TOP 20

PC WORLD POWER DESKTOPS

1 **Dell Dimension XPS P90**
All-time best power system.

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P90	2	3	Mar 95	78	83	71/75	$3363	Pentium-90	16	1020
2 Dell OptiPlex XMT 590	4	5	Jan 95	76	82	71/75	$3449	Pentium-90	16	1080
3 Micron P90PCI PowerStation	1	4	Feb 95	75	86	65/69	$3199	Pentium-90	16	1080
4 Dell Dimension XPS P100	7	3	Mar 95	75	77	71/75	$3887	Pentium-100	32	1080
5 Dell OptiPlex XMT 5100	—	1	current	75	83	71/75	$4059	Pentium-100	16	1080
6 Digital Celebris XL590	—	1	current	75	86	75/73	$5522	Pentium-90	16	1010
7 Quantex QP5/90W-3	3	3	Mar 95	72	79	58/67	$2997	Pentium-90	16	1083
8 Micron P90 Home MPC	8	5	Jan 95	72	79	65/69	$2499	Pentium-90	8	528
9 USA Flex PT90 MidTower	—	1	current	71	84	[2]	$3999	Pentium-90	16	1080
10 Gateway 2000 P5-100XL	10	3	Mar 95	71	84	58/61	$3799	Pentium-100	16	1063
11 DFI Diamond P90	15	4	Feb 95	71	84	[2]	$3395	Pentium-90	16	1080
12 Austin Power System 90	6	8	Oct 94	71	83	[2]	$3499	Pentium-90	16	1057
13 DFI Diamond P100	—	1	current	70	83	[2]	$3495	Pentium-100	16	1080
14 Tagram Thunderbolt XL	11	4	Feb 95	70	86	[2]	$2900	Pentium-90	16	540
15 MidWest Micro Elite P5-90 Home PC	21	1	Apr 95	70	86	[2]	$2913	Pentium-90	16	730
16 Everex Step SP/100	5	3	Mar 95	70	86	[2]	$3295	Pentium-100	16	1275
17 Dell OptiPlex XMT575	44	1	Apr 95	70	66	71/75	$3081	Pentium-75	16	540
18 Robotech Cobra RS p90	20	5	Jan 95	70	84	[2]	$3152	Pentium-90	16	730
19 HP Vectra XU 5/90C PC	68	1	Oct 94	70	80	78/73	$5675	Pentium-90	16	540
20 AT&T Globalyst 600	25	2	Feb 95	69	75	75/65	$3965	Pentium-90	16	540

BEST BUY

[1] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/993-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in

2 Dell OptiPlex XMT 590
Best Buy for second month.

3 Micron P90PCI PowerStation
Speediest Best Buy PC.

4 Dell Dimension XPS P100
Quick, lots of RAM.

5 Dell OptiPlex XMT 5100
Very fast, very upgradable.

	CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number[1]	Reader service no.	Comments (Recommended as home system)
	3X	ISA, PCI	15"/.28	800/613-3355	3202	614	Perennial no. 1 Best Buy regains top spot.
	2X	ISA, PCI	15"/.28	800/613-3355	3173	615	Dell's reliability and service take corporate version of Dell's Dimension XPS P90 to no. 2.
	2X	ISA, PCI	15"/.28	800/223-6571	3184	616	Great blend of price, features, and power breaks up Dell monopoly of Best Buys.
	2X	ISA, PCI	15"/.28	800/613-3355	3203	617	100-MHz version of no. 1 Best Buy also a tremendous value.
	2X	ISA, PCI	15"/.28	800/613-3355	3222	618	Corporate version of the XPS P100 costs more but has better expandability.
	2X	ISA, PCI	17"/.26	800/722-9332	3223	619	Blazing Pentium-90 from highly reliable vendor.
	2X	ISA, PCI	17"/.26	800/288-0566	3200	620	Low-cost power system with big monitor.
	2X	ISA, PCI	14"/.28	800/223-6571	3172	621	Top-rated power home PC hindered only by a small monitor.
	4X	ISA, PCI	17"/.26	800/872-3539	3224	622	Serious home and multimedia powerhouse with quad-speed CD-ROM and large monitor.
	4X	ISA, PCI	17"/.26	800/846-2000	3204	623	Another multimedia powerhouse with quad-speed CD-ROM and 17-inch monitor.
	2X	ISA, PCI	17"/.26	800/808-4334	3188	624	Fast, fully loaded home system.
	2X	ISA, PCI	17"/.28	800/331-1501	3142	625	Solid, fast Pentium-90 is a good office standard.
	2X	ISA, PCI	17"/.26	800/808-4334	3225	626	Solid Pentium-100 performance, fully loaded home system.
	4X	ISA, PCI	15"/.28	800/824-7267	3187	627	Fast and cheap—a good general-purpose system.
	2X	ISA, PCI	15"/.28	800/728-8582	3226	629	Price cut edges basic Pentium-90 onto Top 20.
	–	ISA, PCI	17"/.28	800/821-0806	3201	630	One of the fastest systems on this Top 20.
	2X	ISA, PCI	15"/.28	800/613-3355	3227	631	Pricey for a Pentium-75, but good performance and great support.
	2X	ISA, PCI	15"/.28	800/533-0633	3174	632	Fast system comes with generous bundle of graphics software.
	2X	ISA, PCI	17"/.28	800/322-4772	3228	633	This powerhouse is expensive but well crafted and backed by top support.
	2X	ISA, PCI	15"/.28	800/872-4547	3240	628	Decent Pentium-90 compact from company with excellent reputation for reliability.

advance (The Top 20 Flash Report, $9.95). Touch-tone phone required. [2] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 125 responses.

For more information about all products in this table, circle reader service no. 902.

Top 20 Power Desktops

THERE ARE FOUR NEW ADDITIONS TO THE power desktops chart, a pair of Pentium-90s and a pair of Pentium-100s. The most promising newcomer is Dell's OptiPlex XMT 5100, which is the only new Best Buy among these four powerhouses. Dell's $4059 tower is accomplished in all areas: It offers Pentium-100 performance, a 1GB hard disk, loads of room to add peripherals, and Dell's highly rated service and support. Also new on the power desktops list is DFI's Diamond P100. This tower is a remarkable deal for $3495, with outstanding performance, multimedia complete with a double-speed CD-ROM drive, a large 17-inch monitor, and a 14.4-kbps fax-modem. Pentium-90 and Pentium-100 systems now have a near corner on the Power Desktops Top 20, and the latter machines are rapidly gaining ground. The first Pentium-100 PC appeared in our review pages only two months ago; now a quarter of the systems on the power chart are based on that top-of-the-line CPU. Vendors still haven't figured out how to fully exploit the Pentium-100 chip's abilities, however—eight of the ten fastest PCs use the veteran Pentium-90.

Dell Dimension XPS P90

REVIEWED: March 1995

PROS: Lightning fast Pentium-90 performance, generous RAM, jumbo hard disk, clean design

CONS: Unlike Dell's OptiPlex line, the Dimension series comes with just a one-year warranty

This Pentium-90 minitower comes with a top-notch set of components: 16MB of RAM, a 1GB hard drive, a CD-ROM drive, a 4MB 128-bit PCI graphics controller, and a 15-inch monitor.

Dell OptiPlex XMT 590

REVIEWED: January 1995

PROS: Terrific Pentium-90 performance, generous RAM, huge hard disk, very clean design, three-year warranty, one of the best service-and-reliability records among PC vendors

CONS: None

Pentium-90 minitower superperformer comes with 16MB of RAM, a 1080MB hard drive, a CD-ROM drive, a combo floppy drive, a 2MB PCI graphics controller, a 15-inch monitor, and a three-year warranty, along with a great service-and-reliability record.

Micron P90PCI PowerStation

REVIEWED: February 1995

PROS: Great price, blazing speed, generous RAM, jumbo hard disk, flat-screen monitor

CONS: Could do better than short one-year warranty, a bit of cable clutter inside

Four-time Best Buy Pentium-90 compact has 16MB of RAM, a 1080MB hard drive, a CD-ROM drive, a 15-inch Mag monitor, and a 2MB 64-bit PCI graphics controller, all for only $3199.

Dell Dimension XPS P100

REVIEWED: March 1995

PROS: Jumbo hard drive, excellent very fast 4MB 128-bit graphics controller, clean design

CONS: A bit pricey at $3887, its one-year warranty is the minimum coverage on today's PCs

This multimedia minitower includes a whopping 32MB of RAM, a 256K secondary cache, a large 1080MB hard drive, and robust performance. The 4MB VRAM graphics card and 15-inch Sony Trinitron monitor add up to a great video subsystem.

Dell OptiPlex XMT 5100

NEW THIS MONTH

PROS: One of the fastest computers available, 1GB hard drive, great expandability

CONS: None

With the OptiPlex XMT 5100, Dell continues its tradition of offering cutting-edge desktops at prices that don't cut too deeply into your finances. The OptiPlex's $4059 price is definitely not in the budget range. But even at that price, you'd have a hard time finding such a fast computer that excels in nearly all respects.

For one thing, this midsize tower is one of the fastest PCs you can buy—not surprising, given its Pentium-100 processor and 16MB of RAM. Then there's the cavernous 1GB Enhanced IDE hard drive, which should see you well into the next few years. Dell also includes a double-speed CD-ROM drive. The video subsystem is decent too, with a 15-inch monitor and a PCI graphics adapter with 2MB of DRAM.

Dell

The Dell pedigree shows in the finer details of the system's design. The expansion slots are elevated above the motherboard, for instance, so the tall heat sink on the hot-running CPU is no longer a potential obstruction to full-length cards. And there are plenty of free slots: four for ISA cards, and two that can take either an ISA or a PCI card. You also get three free drive bays.

Dell's attention to detail extends even to the documentation: The user-friendly, thorough manuals neglect the CD-ROM drive, but everything else is well covered. And a special program group preinstalled in Windows lets you find basic information about your system and the Dell service resources available to you. In addition, the company offers a lengthy three-year warranty, including a year of free on-site service. There is no established turnaround time on factory repairs, but that's a quibble compared to the toll-free, 24-hour technical support available seven days a week. Dell also

scores very well on our ongoing reader fax-back survey, which reports on a PC company's service and system reliability.

The Dell OptiPlex XMT 5100 lacks some equipment we're seeing more and more often on PCs—such as a fax-modem, a sound card, and speakers. Still, Dell's latest offers a powerful combination of speed, expandability, and service.

6 Digital Celebris XL590

NEW THIS MONTH

PROS: Fast, is capable of accepting a second Pentium-90 CPU, 1GB hard drive, large monitor

CONS: One of the most expensive computers in the desktop category listed in our databases

$5522 is a big chunk of change, but if you're wrestling with enormous company databases, high-end graphics, or other Herculean computing tasks, Digital's powerful Celebris XL590 midsize tower could very well be worth the extra investment.

Digital

This Pentium-90 PC rampaged through our tests well ahead of the average system in its class, placing it on a par with machines based on the top-of-the-line Pentium-100 processor. The system turned in particularly good scores in Windows applications, including Excel, Word, and Paradox. Digital includes a strong base configuration: 16MB of RAM, a massive 1GB hard drive, 256K of secondary cache, and a Toshiba dual-speed CD-ROM drive. For high-resolution graphics, a wide 17-inch monitor (with a viewable area of 16 inches) is paired with a 2MB Diamond Stealth 64 graphics accelerator card to provide an excellent video subsystem. However, if you plan to use this computer simply as a server, you can slash up to $800 off the price by opting for a more modest graphics card and a smaller monitor.

Upgrade space? You get two free drive bays. You also can fit five additional cards (all full-length) into the system—three ISA, one PCI, and either an ISA or a PCI card in the fifth slot. We were impressed by the RAM potential—four free SIMM sockets allow for more than enough memory to satisfy most users' needs. A particularly cool upgrade feature is the system's PCI-based CPU riser card. It hosts not only the secondary memory cache, but also a second ZIF CPU socket, so you can plug in an extra Pentium-90 processor. This feature is useful for people interested in running Windows NT, and some versions of the OS/2 and UNIX operating systems that can take advantage of a multiprocessor computer.

Digital's commendable service-and-support plan includes a three-year warranty and free on-site repairs during the first year. The company also promises to return repaired systems from the factory within two business days. Technicians are available toll free 24 hours a day, every day of the week. Digital system owners responding to our fax-back survey gave the company strong scores for the support they received. In short, the Celebris XL590 may be high priced, but it's a super machine that's backed by Digital's reputation for building top-notch systems and supporting them well. If you've got big projects to tame, give this power desktop—which landed just one spot short of a Best Buy—a close look.

7 Quantex QP5/90W-3

REVIEWED: March 1995

PROS: Low $2997 price, solid Pentium-90 speed, generous 16MB of RAM, jumbo hard drive, 17-inch monitor, CD-ROM drive, 14.4-kbps fax-modem, plenty of expandability

CONS: Could do better than short one-year warranty, some cable clutter inside

8 Micron P90 Home MPC

REVIEWED: January 1995

PROS: Decent Pentium-90 performance; great $2499 price; full set of multimedia features; good software bundle including Microsoft Works, Encarta, and Quicken; decent expandability

CONS: Somewhat skimpy one-year warranty, 14-inch monitor is on the small side

9 USA Flex PT90 MidTower

NEW THIS MONTH

PROS: Impressive multimedia setup with quadruple-speed CD-ROM drive and wave-table MIDI sound card, large 17-inch monitor, very fast 4MB VRAM graphics card

CONS: Somewhat pricey for a typical Pentium-90 computer

The best way to make multimedia work is to buy a system with all the multimedia components already installed. The PT90 MidTower from USA Flex comes preconfigured for any contingency, with a full set of multimedia hardware, a powerful 90-MHz Pentium processor, and an impressive stack of CD-ROM software. But this medium tower system isn't cheap—at $3999, it's pricier than most of its Pentium-90 competitors. Still, the outstanding hardware bundle and strong expandability are so good that this PC is still an excellent value.

USA Flex

The company cut few corners when assembling its latest system. You get a huge 1GB hard drive, an ample 16MB of RAM, and 256K of secondary cache, which should be plenty for almost any business application. In our tests, the PT90 was somewhat faster than a typical 90-MHz Pentium desktop. And the PT90 is stuffed with extras, making it one of the best multimedia systems we've seen. A quadruple-speed CD-ROM drive delivers optimum performance for multimedia titles and video, while a 16-bit sound card provides realistic-sounding wave-table MIDI playback. You even get an impressive set of speakers with a separate subwoofer. And this system boasts serious graphics, with a fast 4MB VRAM graphics card that's a fine match for the spacious 17-inch monitor. Topping off this impressive bundle is a 14.4-kbps fax-modem complete with both Windows and DOS versions of the FaxWorks fax package and Comit Lite data communications program.

For all this, the PT90's relatively small chassis has a surprising amount of room to add more components. There are three free drive bays, as well as one free PCI slot, two free ISA slots, and a fourth slot that accepts either a PCI or an ISA card. The overall design is good, with the system's inside quite uncluttered for a computer packed with multimedia components. While we haven't received enough responses from our ongoing reader fax-back sur-

vey to comment on this company's service-and-reliability record, USA Flex's three-year warranty is generous, and technical support is available around the clock, including on weekends. In sum, the PT90 is a gung-ho multimedia machine that has it all. No wonder it roared onto our Power Desktops Top 20.

10 Gateway 2000 P5-100XL

REVIEWED: March 1995

PROS: Fast Pentium-100 speed, 17-inch monitor, spacious hard drive, quad-speed CD-ROM drive, outstanding software bundle including Microsoft Office Professional, three-year warranty

CONS: Would cost less without the extras, long waits on hold for technical support

11 DFI Diamond P90

REVIEWED: February 1995

PROS: Fast Pentium-90 performance, large hard disk, multimedia and home office features

CONS: You have to pay for the technical support call, very short five-day money-back guarantee

12 Austin Power System 90

REVIEWED: October 1994

PROS: Very fast even for a Pentium-90 system, large hard disk, 17-inch monitor

CONS: Short one-year warranty, documentation on this model could be more detailed

13 DFI Diamond P100

NEW THIS MONTH

PROS: Fast performance, nice price, multimedia setup, good expandability

CONS: None

DFI has impressed us lately with its feature-rich Pentium systems, and the DFI Diamond P100 is no exception. This rangy tower packs a 100-MHz Pentium processor, 16MB of RAM, and 256K of secondary cache to provide ample speed for even the most demanding power users. Add to this the system's double-speed CD-ROM drive and its sound card, and the $3495 street price is a downright bargain.

DFI

The Diamond P100 soared to lofty heights in our application tests, with performance in the range of most Pentium-100s we've seen—meaning this machine is noticeably faster than a typical Pentium-90 system. But it's the extras that make the difference. The P100 is perfect for the home office, with a fax-modem that can exchange faxes and data files at 14.4 kbps and comes with BitComm and BitFax software. A 16-bit sound board with speakers complements the Mitsumi CRMC-FX400 CD-ROM drive. And DFI doesn't skimp on the graphics. The large 17-inch display provides easy-on-the-eyes refresh rates at high resolutions, while the 2MB PCI graphics board delivers up to 16.8 million colors at 800 by 600 resolution. Finally, you get a 1GB Enhanced IDE hard drive, which should provide ample space for most users.

Even with its full load of peripherals, the Diamond P100 has two free ISA slots, one free PCI slot, and a fourth open slot that can accept either a PCI or an ISA card. And with two free SIMM sockets and six open drive bays, expandability is a strong suit. One thing to note: The PCI slots on the motherboard sit near the floor, which may limit placement of the monitor since its cord isn't very long. DFI's two-year warranty is adequate, and the company promises a two-day turnaround on repairs. However, we would like to see technical support hours that also include weekends. The DFI Diamond P100 has a few flaws, but its power and impressive multimedia configuration for the price make this a system well worth recommending.

14 Tagram Thunderbolt XL

REVIEWED: February 1995

PROS: Ultrafast Pentium-90 performance, low $2900 price, three-year warranty

CONS: 540MB hard drive is smaller than most Pentium-90s', interior is somewhat crowded

15 MidWest Micro Elite P5-90 Home PC

REVIEWED: April 1995

PROS: Very fast Pentium-90 speed, low $2913 price, 730MB hard disk, multimedia

CONS: Short technical support phone hours, no guaranteed turnaround time on factory repairs

16 Everex Step SP/100

REVIEWED: March 1995

PROS: Super Pentium-100 performance, cavernous 1.3GB hard disk, large 17-inch monitor teamed with superfast ATI Graphics Pro Turbo graphics accelerator, good expandability

CONS: Everex is one of the few vendors that don't offer toll-free tech support

17 Dell OptiPlex XMT575

REVIEWED: April 1995

PROS: Multimedia configuration, fast Pentium-75 performance, three-year warranty

CONS: $3081 is high for a Pentium-75, somewhat small 540MB hard disk

18 Robotech Cobra RS p90

REVIEWED: January 1995

PROS: Great Pentium-90 performance, impressively large and varied software bundle

CONS: Minitower case is a little crowded, some cable clutter under the hood

19 HP Vectra XU 5/90C PC

REVIEWED: October 1994

PROS: Decent Pentium-90 performance, three-year warranty, top-notch service and reliability

CONS: $5675 price is very high, only one free drive bay available

20 AT&T Globalyst 600

REVIEWED: February 1995

PROS: Superior reliability-and-service record, great expandability including PCMCIA slots

CONS: Exceptionally expensive for a Pentium-90, especially given relatively modest feature set

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The long list of system files, DLLs, VxDs, Help files, .ini files, add-ons and other stuff that pops up on your screen will give you a pretty good idea of how much disk space you've been wasting.

And since all those files are scattered all over your system, they're *very* hard to find. Which is why CleanSweep comes equipped with exclusive Helper Technology that understands the bizarre installation habits of popular Windows programs.

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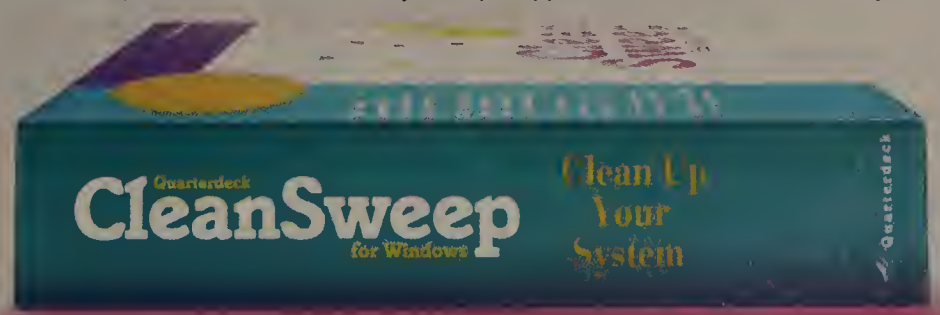
CleanSweep knows more than just where to look for the maximum number of files. It also knows what to do when it finds them.

And what not to do.

Since uninstalling the wrong file–say, a shared DLL–can disable other programs you use daily, CleanSweep uses SuperLinks to track files that are needed by multiple applications.



It also lets you view any file, confirm every action, undo anything you've done and even perform trial runs to see how much disk space you're about to gain.

Which is just the sort of ingenious functionality you'd expect from Quarterdeck, the folks who brought memory management to millions with the legendary QEMM.®

LEAVE NO FILE UNTURNED.

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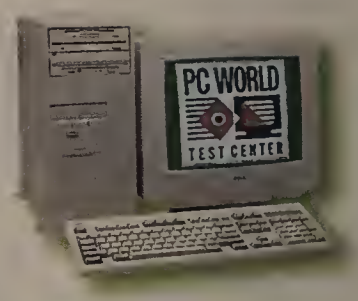
THE TOP 20

PC WORLD

BUDGET DESKTOPS



1 **Dell Dimension XPS P75**
Fast, well equipped.

	Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P75	–	1	Mar 95	73	62	71/75	$2213	Pentium-75	8	560
2 Polywell Poly 486-80VB	7	4	Feb 95	73	63	[2]	$1639	Am486DX2-80	8	540
3 Micro Express MicroFlex-VL/80	3	3	Mar 95	73	57	[2]	$1499	Am486DX2-80	8	420
4 Micro Express MicroFlex-VL/104	–	1	current	73	61	[2]	$1699	AmDX4-100	16	540
5 Diamond DT 486/100 VIP	15	3	Mar 95	72	60	[2]	$1699	DX4-100	8	540
6 Micron 4100 PCI Magnum	12	8	Aug 94	71	62	65/69	$1999	DX4-100	8	420
7 Polywell Poly 560MPC	11	3	Jan 95	71	65	[2]	$1995	Pentium-60	8	546
8 Polywell Poly 486-100VP4	–	1	current	71	63	[2]	$1950	AmDX4-100	16	500
9 Gateway 2000 P5-60	–	1	Oct 94	71	62	58/61	$2099	Pentium-60	8	730
10 Diamond DX4-100	–	1	current	71	56	[2]	$1995	AmDX4-100	16	540
11 Micron Family MPC LPX	18	6	Dec 94	71	51	65/69	$1909	486DX2-66	16	420
12 Quantex QP5/60PM-2	2	2	Jan 95	71	61	58/67	$2174	Pentium-60	8	540
13 AST Premmia MX 41100T	28	3	Oct 94	70	54	68/68	$1900	DX4-100	8	270
14 Gateway 2000 P5-60 Family PC	–	2	Dec 94	70	60	58/61	$2099	Pentium-60	8	730
15 Blackship Atlantis	9	4	Feb 95	70	45	58/59	$1695	486DX2-66	8	540
16 Micro Express Micro Flex VL/D6	22	2	Mar 95	70	47	[2]	$1349	486DX2-66	8	270
17 USA Flex DX4/100 Desktop	–	1	current	70	67	[2]	$2199	DX4-100	16	730
18 DFI Diamond 66	30	2	Feb 95	70	50	[2]	$1839	486DX2-66	8	540
19 USA Flex PT-60 Tower	20	7	Nov 94	70	60	[2]	$1899	Pentium-60	8	425
20 Intelesys IN586/60	24	4	Dec 94	70	58	58/60	$1799	Pentium-60	8	430

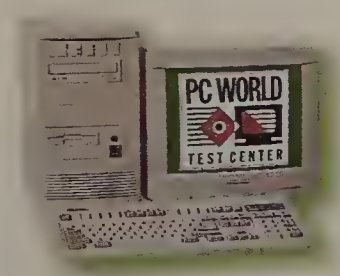
BEST BUY

[1] Call 800/434-4495 (for payment by Visa or MasterCard) or 900/993-2972 (for telephone billing) and use the fax reprint numbers listed above to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in

2 **Polywell Poly 486-80VB**
Pentium-level speed, great price.

3 **Micro Express MicroFlex-VL/80**
Lowest-cost Best Buy.

4 **Micro Express MicroFlex-VL/104**
Great performer, low cost.



5 **Diamond DT 486/100 VIP**
Inexpensive, speedy.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [1]	Reader service no.	Comments (Recommended as home system)
2X	ISA, PCI	15"/.28	800/613-3355	3229	634	Great price for Pentium-75 with decent performance and a multimedia configuration.
2X	ISA, VL	14"/.28	800/999-1278	3194	635	Low-cost DX2-80 is faster than some Pentiums.
–	ISA, PCI	15"/.28	800/989-9900	3208	636	Cheap and fast.
2X	ISA, VL	15"/.28	800/989-9900	3230	637	Tons of RAM in this AmDX4-100 with decent performance.
–	ISA, PCI [3]	14"/.28	800/989-7253	3211	638	Solid Pentium-60–level performer at an incredible price.
2X	ISA, VL	14"/.28	800/233-6571	3125	639	Fast, good price, and good service.
2X	ISA, VL	14"/.28	800/999-1278	3219	640	Cheap home Pentium system.
2X	ISA, PCI [3]	14"/.28	800/999-1278	3231	641	Lots of RAM in this cheap AmDX4-100.
2X	ISA, PCI	15"/.28	800/846-2000	3232	642	Big price cut moves Gateway Pentium onto budget chart.
2X	ISA, PCI	15"/.28	800/989-7253	3233	643	AMD version of Diamond DT 486/100 VIP has more RAM but is slower than that Best Buy.
2X	ISA, VL	14"/.28	800/233-6571	3220	644	Loaded DX2-66 home PC.
2X	ISA, PCI	17"/.26	800/288-0566	3217	645	Pentium home system still priced right for all you get, especially with a 17-inch monitor.
–	ISA, PCI	15"/.28	800/876-4278	3234	646	Small hard drive, otherwise solid low-cost PC with above-par service and reliability.
2X	ISA, PCI	15"/.28	800/846-2000	3235	647	Good all-around system with a large hard drive at a decent price.
2X	ISA, VL	15"/.28	800/531-7447	3192	648	Decent-value home PC with ordinary reliability and service.
–	ISA, PCI	14"/.28	800/989-9900	3236	649	Cheap DX2-66 system needs a bigger hard drive.
2X	ISA, VL	15"/.28	800/872-3539	3237	650	Big hard drive on fastest Budget Top 20 system.
2X	ISA, PCI	15"/.28	800/808-4334	3238	651	Ordinary-value DX2-66.
–	ISA, PCI	15"/.28	800/872-3539	3221	652	Overall very good value for the low price.
–	ISA, PCI	14"/.28	800/577-2486	3239	653	Cheap Pentium needs a better monitor and a CD-ROM drive.

advance (The Top 20 Flash Report, $9.95). Touch-tone phone required. [2] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 125 responses. [3] Also has VL expansion slots.

For more information about all products in this table, circle reader service no. 903.

Top 20 Budget Desktops

INCREASED COMPETITION AMONG CHIP MAKERS can only mean better deals for PC consumers, and there's more of that than ever: CPU manufacturer AMD is making the most aggressive push yet of any Intel rival onto a Top 20 list. There are more systems using this company's chips than ever in a Top 20—three of the four new PCs (all DX4-100s) to make it onto this chart are based on AMD CPUs. Now one in four Budget Top 20 PCs is based on the company's processors. And AMD-based systems are reaching the greatest heights yet within the category: Three of the five Best Buys use AMD chips. Only two months ago, DX2-66 PCs virtually locked up the Best Buy spots on our Budget Desktops Top 20, but now systems based on this venerable chip are ceding the limelight to fresher, more capable talent, including two Best Buy desktops based on AMD's Am486DX2-80 CPU. The highest-ranked newcomer, our number four Best Buy, is Micro Express's MicroFlex-VL/104. This AmDX4-100 minitower sells for only $1699, keeps pace with most Pentium-60 machines, and is stocked with 16MB of RAM, a 540MB hard disk, a CD-ROM drive, and a 15-inch monitor.

Dell Dimension XPS P75

REVIEWED: March 1995

PROS: Decent Pentium-75 performance, multimedia configuration, great service and support

CONS: Its one-year warranty is the minimum for today's PCs, 1MB graphics controller

Bargain-priced $2213 Pentium-75 multimedia minitower comes with 8MB of RAM, a 256K secondary cache, a 560MB hard drive, and a 15-inch monitor. With zippy performance and rock-solid service and support, it locks up the top budget spot.

Polywell Poly 486-80VB

REVIEWED: February 1995

PROS: Pentium-60–level speed from a super–budget-priced Am486DX2-80 PC, CD-ROM drive

CONS: The supplied 14-inch monitor is the smallest found on current systems

Hot AMD Am486DX2-80 processor delivers Pentium-60–level performance in this compact PC. No-frills unit gives you 8MB of RAM, a 540MB hard disk, and a CD-ROM drive.

Micro Express MicroFlex-VL/80

REVIEWED: March 1995

PROS: High performance for a very low $1499 price, minitower case has good expandability

CONS: None

AMD Am486DX2-80 minitower with 8MB of RAM, a 420MB hard disk, a 15-inch monitor, a 2MB graphics board, and lots of room to upgrade, all for a bargain-basement price.

Micro Express MicroFlex-VL/104

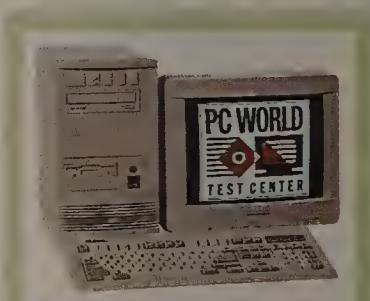
NEW THIS MONTH

PROS: Great price for a PC that performs like a Pentium-60, generous 16MB of RAM

CONS: None

If you think you have to pay an astronomical price for a reasonably fast, loaded machine, Micro Express's MicroFlex-VL/104 will surprise you. The $1699 price buys an astonishing amount of machine—so much, in fact, that the VL/104 ranks as a Best Buy in our budget desktops category.

First, let's talk about performance. The VL/104's 16MB of RAM helped this AmDX4-100 system breeze through our benchmarks as quickly as the typical system in its CPU class, putting it on a par with the average Pentium-60 desktop. And Micro Express supplements its PC's powerful performance with a host of quality components. A 1MB VLB caching controller greatly speeds up data access times from the 540MB hard drive. And the 2MB 64-bit VLB graphics accelerator coupled with a 15-inch monitor provides sharp images at resolutions of up to 1024 by 768 noninterlaced. The system also comes with a CD-ROM drive. Do you want full multimedia? You can add a 16-bit sound card and a pair of external speakers to the system for another $129.



Micro Express

Though the VL/104 comes in a minitower case, you'll still find plenty of space to add components. All three of the free drive bays are externally accessible, making it easy to add peripherals. And you get three free 16-bit slots and a single free 8-bit slot. The six SIMM sockets, which accept four 30-pin and two 72-pin modules, are easy to access. Micro Express installed the 16MB of RAM in a single 72-pin module, leaving the remaining five sockets free. But you'll need to replace the installed secondary cache modules to move up to the 512K limit. If you want this much cache, we recommend getting it factory installed when you order the PC, since upgrading socketed cache can be a delicate operation.

Micro Express provides an attractive support package. This direct sales company offers a two-year warranty, a year of free on-site service, and a 30-day money-back guarantee. However, even though support lines are open 24 hours a day, you have instant toll-free access to help only during business hours. During evenings and on weekends, you must leave a message on a toll line and wait for a technician to call you back. Micro Express offers support via fax but not BBS. We have too few responses from our reader fax-back survey to comment on the company's service and reliability.

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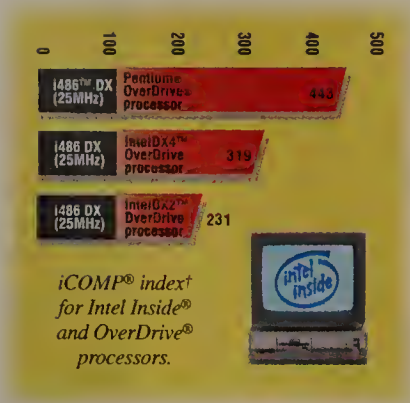

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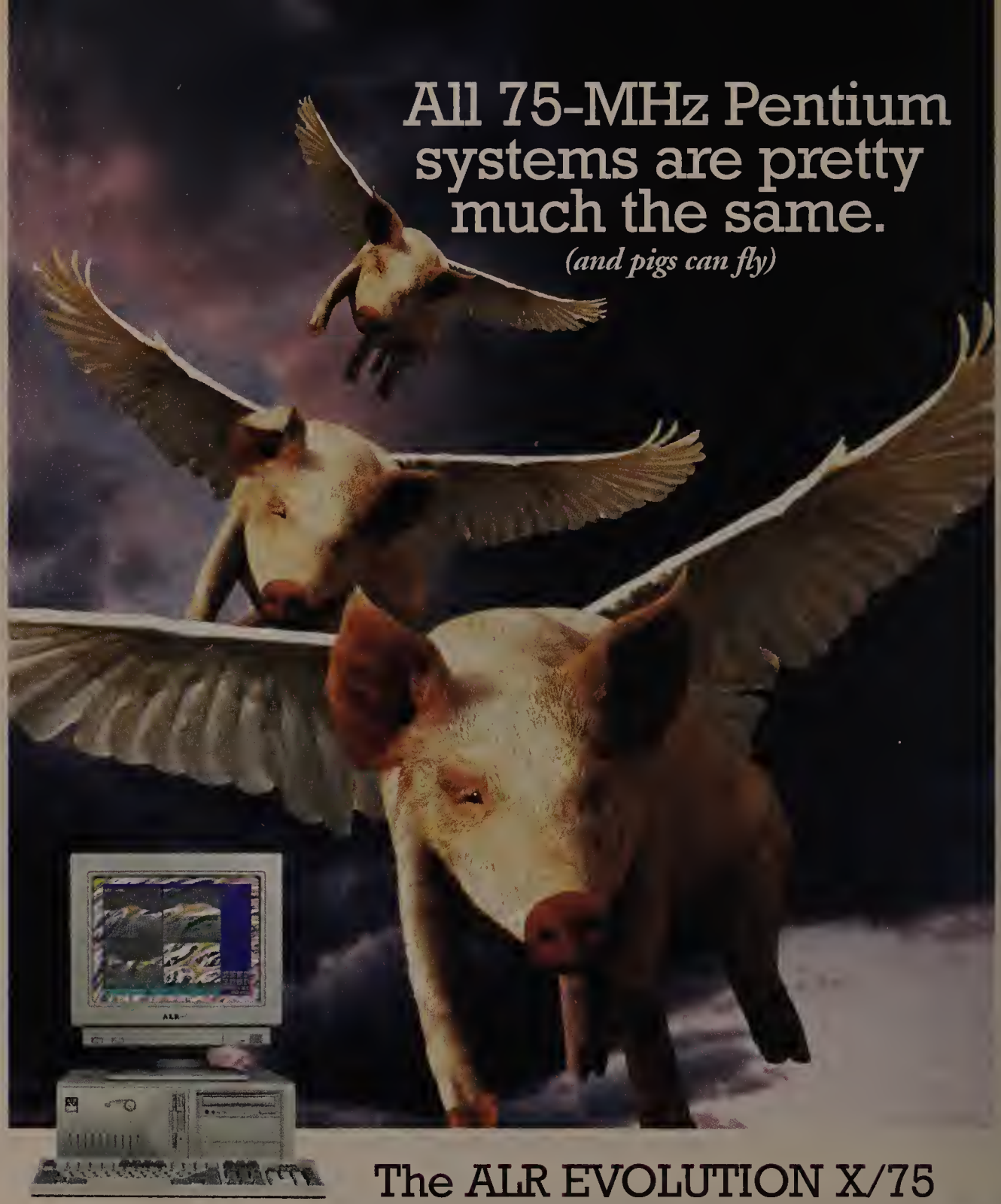

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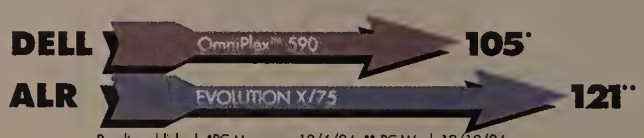
Winstone 95
Higher Score is Better
Winstone 95 Ver. 1.0 tests to measure the machines' performance when running typical Windows applications.



Results published: *PC Magazine 12/6/94, ** PC Week 12/19/94

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In sum, those seeking a budget system can hardly go wrong with this machine. The VL/104 proves that even users with a limited budget can get a reasonably capable and powerful PC.

5 Diamond DT 486/100 VIP

REVIEWED: March 1995

PROS: $1699 price is unusually low for a DX4-100 system, has both PCI and VL bus connectors

CONS: One of the few PC vendors that don't offer toll-free tech support, has 14-inch monitor

Budget-priced DX4-100 has 8MB of RAM, a 256K secondary cache, a 540MB hard drive, and VL and PCI connectors, which allow unusual upgrading flexibility. The 14-inch monitor is small.

6 Micron 4100 PCI Magnum

REVIEWED: August 1994

PROS: This DX4-100 PC turned in noticeably better test results than the typical Pentium-60 system, reasonable price, company received high service rating on reader fax-back survey

CONS: Minimal one-year warranty, 14-inch monitor is the smallest currently sold with PCs

7 Polywell Poly 560MPC

REVIEWED: January 1995

PROS: Low $1995 price for a PC with fast Pentium-60 performance and a voice fax-modem

CONS: 14-inch monitor is quite small even for a budget computer

8 Polywell Poly 486-100VP4

NEW THIS MONTH

PROS: Good performance; lots of RAM; ISA, PCI, and VLB slots; CD-ROM drive and sound card

CONS: Small monitor, a bit of case and motherboard flex, a lot of cable clutter inside

Buying a bargain PC can be a tricky business because vendors often skimp on critical components such as RAM and hard drives, leaving users with too little hardware to keep up with rapidly growing software needs. Not so with the Polywell Poly 486-100VP4, thanks to an ample configuration that includes an AmDX4-100 processor, 16MB of RAM, and 256K of secondary cache. The fact that you get ISA, PCI, and VLB expansion slots on the same motherboard makes this bargain an even more intriguing buy. The $1950 street price of this minitower even includes a Sound Blaster 16 sound card and a double-speed CD-ROM drive. Best of all, the Poly 486-100VP4 is fast, with performance in our application tests showing it to be more than a match for a typical DX4-100 system using the Intel processor.

It's true that Polywell cut a few corners to pull off this deal. The system's chassis and motherboard allow excessive flex, inviting stress or damage during installations and moves, and the tray on the Sony CD-ROM drive is a bit flimsy. In addition, the 486-100VP4's minitower case is clogged with cables—a problem common to loaded multimedia systems—making it tough to reach components. And the monitor is only 14 inches—the minimum size these days—and has low refresh rates at higher resolutions; it hardly does justice to the fast 2MB Diamond Stealth 64 PCI-based graphics board that accompanies it. Still, users who want to move existing VL bus peripherals to a new system will enjoy the shared space for a PCI or VL bus card if they move the ISA card currently in it to one of the dedicated ISA slots. You also get two free ISA slots, three free PCI slots, and four free drive bays. The 500MB IDE hard disk should be adequate for most users, and the Sound Blaster card comes with speakers and a microphone. Plus, the system includes Grolier's Multimedia Encyclopedia and some other CD-ROM software to get you started.

Polywell

On the whole, the Poly 486-100VP4 is a great deal of PC for the money, and solid support adds to the value. Polywell's warranty (two years for parts and five for labor) is among the best you can find, and toll-free technical support is available around the clock on business days and 4 hours on Saturdays. Despite a few rough edges, the Polywell Poly 486-100VP4 is a strong member of this month's Budget Desktops Top 20.

9 Gateway 2000 P5-60

REVIEWED: October 1994

PROS: Affordable Pentium-60 speed, CD-ROM drive, comes with Microsoft Office Professional

CONS: None

10 Diamond DX4-100

NEW THIS MONTH

PROS: Great price for a decked-out multimedia PC with Pentium-level speed

CONS: Poor documentation, short tech support hours, $75 for on-site service for the first year

Diamond's latest gem is bound to spark a lot of interest. The Diamond DX4-100 offers Pentium-60 performance, comes packed to the rafters with extras, and sells for only $1995. How did Diamond keep the costs down? One way was to use the AmDX4-100, AMD's version of the DX4-100 processor—it's a less expensive chip that offers performance comparable to that of its Intel counterpart, which also means this system keeps pace with the typical Pentium-60 desktop. The basic configuration includes an ample 16MB of RAM, a 540MB hard drive, and a 15-inch monitor teamed up with a 2MB ATI WinBoost video board. And then there's multimedia. You get a CD-ROM drive, a sound card, a pair of speakers, and a slew of CD-ROM titles, including Microsoft Works, a popular integrated package. There's room to add more devices. You get two free drive bays, two free PCI and one free ISA slot, and a fourth slot that accommodates either a PCI or an ISA card. Also, three of the four SIMM sockets are free.

Diamond

Are there any areas in which the Diamond DX4-100 doesn't shine? For one, its documentation is sparse, a drawback for neophytes and experienced users alike. For another, the company's service-and-support policies are a mixed bag. Diamond backs its

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systems with a decent 15-month parts and 24-month labor warranty, and you get a typical 30-day money-back guarantee. But while the company promises to turn around factory repairs within two days at no extra charge, you have to shell out $75 for on-site service for the first year. The company offers a BBS but no fax support. Finally, while you get technical support on Saturdays, it's available for only 9 hours a day during the week.

Nonetheless, these are just a few minor flaws in an otherwise glittering presentation. Simply put, the Diamond DX4-100 is a great buy. Whether you're looking for a system for your business or your home, $1995 buys you a lot of PC. It's no wonder the DX4-100 easily lands on our Budget Desktops Top 20.

11 Micron Family MPC LPX

REVIEWED: December 1994

PROS: Excellent performance for a DX2-66, multimedia configuration, very good service record

CONS: Minimal one-year warranty, 14-inch monitor is small for a multimedia system

12 Quantex QP5/60PM-2

REVIEWED: January 1995

PROS: Good price for this ample configuration with many extras, good Pentium-60 performance

CONS: The one-year warranty is the minimum found on PCs these days, some cable clutter

13 AST Premmia MX 4110OT

REVIEWED: October 1994

PROS: Excellent service-and-support policies, very good service-and-reliability record

CONS: Slow for a DX4-100, small 270MB hard drive, underpowered 1MB graphics card

14 Gateway 2000 P5-60 Family PC

REVIEWED: December 1994

PROS: Multimedia configuration, affordable price, decent Pentium-60 performance

CONS: The 1MB graphics accelerator has less graphics RAM than the typical card offered today

15 Blackship Atlantis

REVIEWED: February 1995

PROS: Decent $1695 price, solid DX2-66 performance, multimedia and home office features

CONS: One-year warranty is the shortest offered today, interior is somewhat crowded

16 Micro Express Micro Flex VL/D6

REVIEWED: March 1995

PROS: At $1349, one of the least expensive PCs we've reviewed; decent DX2-66 performance

CONS: The 14-inch monitor and 270MB hard disk are minimal components in PCs these days

17 USA Flex DX4/100 Desktop

NEW THIS MONTH

PROS: Fast for a DX4-100, multimedia configuration, great speakers, 14.4-kbps fax-modem

CONS: The system's documentation, while plentiful, is generally too technical

USA Flex is becoming good at offering exceptionally fast PCs at affordable prices. Take its latest unit, the Flex DX4/100 Desktop: It not only outperformed most of its DX4-100 peers, it also kept pace with the average Pentium-66, yet it sells for only $2199. Making this kind of speed accessible to the budget buyer helped place this PC on our Budget Desktops Top 20.

USA Flex

On top of this machine is a 15-inch monitor. One of the first things we noticed after popping the lid off the PC's compact case was a nice, clean layout. Inside we found a generous 730MB hard drive, 256K of secondary cache, a 2MB 32-bit Paradise Bahamas 64 video card, and a 14.4-kbps fax-modem. The Flex DX4/100 Desktop's thorough multimedia array includes a CD-ROM drive, a 16-bit sound card, and some of the best speakers we've ever seen on a system sent to us for review: a pair of compact Altec Lansing speakers complemented by a floor-model subwoofer. The software bundle includes Microsoft Works as well as some games and reference tools. The downside of having such a raft of peripherals is limited expandability. Though you get four free drive bays, only three ISA expansion slots remain free.

Support policies are excellent: The Flex DX4/100 Desktop comes with a three-year warranty and 24-hour, seven-day-a-week toll-free support. USA Flex also offers a 30-day money-back guarantee and a three-day turnaround on repairs. However, the system would benefit from simpler documentation. Though it comes with manuals for all the components, some of them are too technical for most new users. We have not received enough responses from our ongoing reader fax-back survey to comment on the company's service and reliability.

The upshot? We have our nitpicks about the system's documentation, but the Flex DX4/100 Desktop's components, impressive performance, and low price helped push it onto this month's Budget Desktops Top 20. With this system, you get Pentium-level performance and solid multimedia for a great price.

18 DFI Diamond 66

REVIEWED: February 1995

PROS: Very fast for a DX2-66 PC, comes with CD-ROM drive, sound card, and 14.4-kbps modem

CONS: The 1MB graphics board is a minimum on current systems

19 USA Flex PT-60 Tower

REVIEWED: November 1994

PROS: System delivers solid Pentium-60 performance, highly expandable, three-year warranty

CONS: None

20 Intelesys IN586/60

REVIEWED: December 1994

PROS: Great $1799 price for a solid Pentium-60 performer, good expandability

CONS: The supplied 14-inch monitor is the smallest currently sold with desktops

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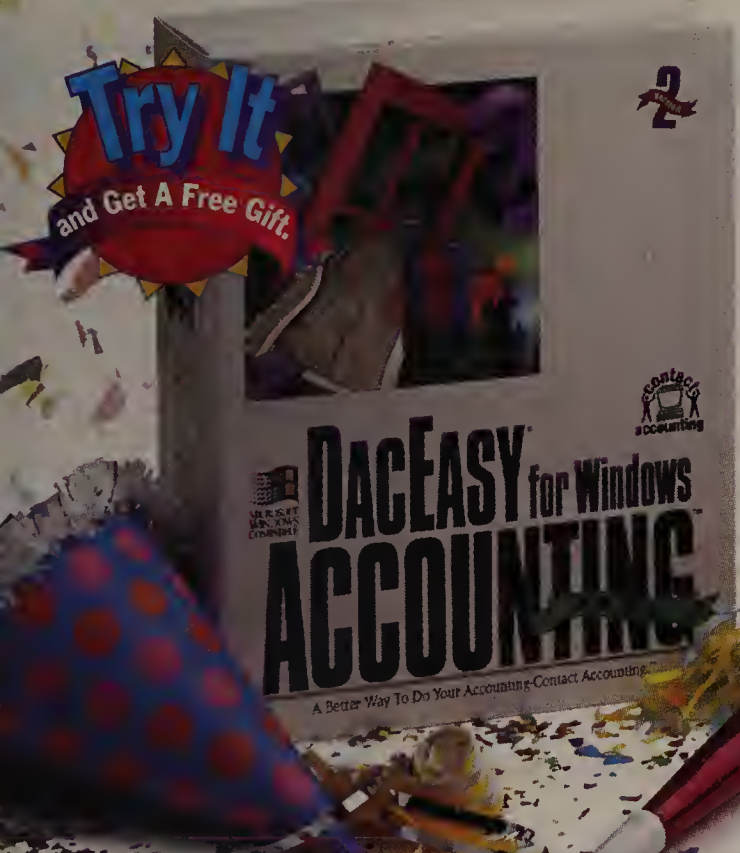

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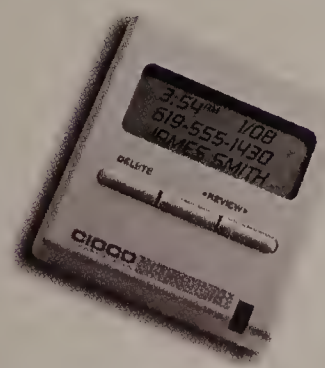

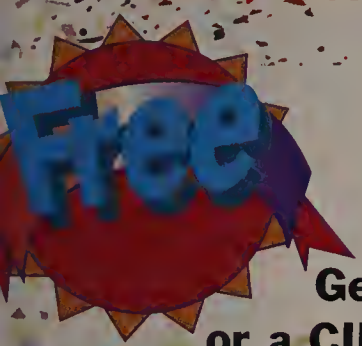

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		Last month	Months on chart	First reviewed	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1	Toshiba T4900CT	1	3	Mar 95	93	54	80/73	$7459	Pentium-75	8	810
2	Dell Latitude XP 4100CX	5	2	Apr 95	93	42	73/75	$4199	DX4-100	8	340
3	AST Ascentia 910N	2	2	Apr 95	92	42	66/66	$4775	DX4-75	8	510
4	WinBook XP DX4-100 8/520 Dual-Scan	–	1	current	92	48	[3]	$2799	DX4-100	8	520
5	AT&T Globalyst 250	3	2	Apr 95	92	51	74/76	$5154	DX4-75	8	540
6	Compaq LTE Elite	4	8	Oct 94	91	37	83/82	$5179	DX4-75	8	340
7	Austin Business Audio 4/100	9	6	Dec 94	91	54	72/62	$3998	DX4-100	16	500
8	Toshiba T4850CT	6	3	Mar 95	90	41	80/73	$5274	DX4-75	8	504
9	MidWest Micro Elite Pentium SoundBook Plus	7	2	Apr 95	90	67	[3]	$5599	Pentium-90	16	720
10	Toshiba Satellite Pro T2450CT	–	1	current	90	44	80/72	$4099	DX4-75	8	320

BUDGET SYSTEMS

1	WinBook XP SX-33 Monochrome	–	1	current	91	27	[3]	$1859	486SX-33	8	260
2	WinBook XP DX2/50	1	4	Feb 95	90	28	[3]	$1995	486DX2-50	8	260
3	Dell Latitude 450C	2	2	Jan 95	90	30	73/75	$2668	486DX2-50	8	523
4	WinBook XP DX4-75 8/520/TFT	5	4	Dec 94	89	34	[3]	$2699	DX4-75	8	520
5	Dell Latitude 475C	–	1	current	88	41	73/75	$2729	DX4-75	8	330
6	Acom Patriot 4000 DX4-100	–	1	current	87	45	62/64	$2725	DX4-100	8	520
7	Austin Business Audio 4/75	4	4	Feb 95	87	36	72/62	$2279	DX4-75	8	250
8	Sceptre SoundX Series 1000	–	1	current	86	37	62/64	$1795	486DX2-66	8	340
9	Acom Patriot 4000	3	3	Mar 95	85	35	62/64	$2190	486DX2-66	8	324
10	CTX EzBook DX2-50	8	3	Mar 95	84	28	62/63	$1958	486DX2-50	8	340

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Best Buy four months running.

Weight (pounds)	Battery life (hours)	Screen type/ size [1]	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments
7.6	3:57	CA/10.4"	800/334-3445	3677	654	Good at everything and has a huge hard drive to boot.
7.4	6:46	CA/9.5"	800/613-3355	3685	655	Big price cut moves Dell with good battery life and service up to Best Buy.
7	7:55	CA/10.4"	800/876-4278	3683	656	Very long battery life.
7.4	3:31	CD/10.3"	800/468-2162	3690	657	Cheap, fast, large screen and hard drive, built-in fax-modem.
8.6	3:49	CA/9.5"	800/637-2600	3684	658	Heavy but fast.
7.2	6:32	CA/9.5"	800/345-1518	3650	659	Slowest Top 20 power note has good battery life.
8.4	3:08	CA/9.4"	800/331-1501	3661	660	Fast and relatively cheap.
8.4	4:22	CA/10.4"	800/334-3445	3678	661	Decent speed, good design, backed by excellent support.
8.2	3:28	CA/10.4"	800/728-8582	3686	662	Best desktop replacement we've seen—but you pay a premium.
7.6	3:46	CA/9.5"	800/334-3445	3691	663	Fast for a DX4-75 and has great service.
6.8	8:45	MP/9.5"	800/468-2162	3692	664	Longest-lasting battery we've seen, lightweight, fax-modem.
6.8	6:46	MP/9.5"	800/468-2162	3673	665	Cheap, with good battery life and features.
7	3:13	CD/9.5"	800/613-3355	3689	666	Top-rated color budget notebook.
7	5:39	CA/9.4"	800/468-2162	3674	667	Decent but standard budget notebook with reasonable speed.
7.2	3:16	CD/9.5"	800/613-3355	3693	668	Very fast for a budget notebook.
8.4	2:47	CD/10.3"	800/898-2665	3694	669	Fastest budget notebook and cheap for a DX4-100, but has a short battery life.
8.2	3:57	CD/9.5"	800/331-1501	3676	670	Decent notebook with good audio.
7.8	2:27	CD/10.3"	800/788-2878	3695	671	Cheapest budget notebook, good audio, poor battery life.
8.4	3:30	CP/10.3"	800/898-2665	3682	672	Good audio on standard notebook.
7.2	4:25	MP/9.5"	800/888-9052	3680	673	Monochrome screen, low price.

You can also order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95). Touch-tone phone required. [3] Insufficient customer responses to our Reliability and Service Monitor to gauge service performance and reliability. For our overall evaluation, we use an average rating derived from all companies for which we have received fewer than 125 responses.

For more information about all products in this table, circle reader service no. 904.

Top 20 Notebooks

A HALF DOZEN OF THE 17 NOTEBOOKS WE reviewed this month cracked our Top 20 chart. Most noteworthy is the WinBook XP SX-33 Monochrome, which cruised to number one in the budget group. How does an SX-33–based monochrome unit get top billing these days? Try a record 8.8-hour battery life, near DX2-50 performance, a light 6.8-pound weight, an internal 14.4-kbps fax-modem, your choice of minijoystick or trackball pointing device, and decent documentation and support—all for only $1859. Despite this surprise top Best Buy, however, today's Top 20 budget notes are starting to look like power notes of just a few months ago. Most come with 300MB-plus hard disks and color screens (one of them active-matrix), and half of these affordable portables offer 4-hour or better battery life. Power notebooks have also made great strides. The hard disks on most of these units are 500MB or larger, and almost all of these top-of-the-line notes come with vivid active-matrix color screens and at least 3-hour battery lives.

Power Notebooks

Toshiba T4900CT

REVIEWED: March 1995

PROS: Great performance, large brilliant color screen, giant hard disk, three-year warranty

CONS: This $7459 computer is one of the priciest notebooks available

Hot-performing 7.6-pound Pentium-75 notebook has 8MB of RAM, an 810MB hard drive, a 10.4-inch active-matrix color screen, over 65,000 simultaneous colors, a near 4-hour battery life, and 24-hour technical support.

Dell Latitude XP 4100CX

REVIEWED: April 1995

PROS: Outstanding design, lithium-ion battery with long life, great service-and-reliability record

CONS: A number of our readers report long waits on hold on sales lines

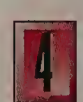
Well-designed DX4-100 notebook has hot-swappable lithium-ion battery with 6.8-hour life, 8MB of RAM, a 340MB hard drive, a 9.5-inch active color screen, a PC Card Type III slot, great online documentation, and a three-year warranty.

AST Ascentia 910N

REVIEWED: April 1995

PROS: Near 8-hour battery life, large brilliant active-matrix color screen, lithium-ion battery, a DX4-75 unit that bested some DX4-100 notebooks in our performance tests, small and light

CONS: $4775 is a fairly high price for a DX4-75 notebook, some looseness in screen hinge



WinBook XP DX4-100 8/520 Dual-Scan

NEW THIS MONTH

PROS: Fast, 520MB hard drive, large color screen, built-in fax-modem

CONS: The one-year warranty is now considered quite short for a computer

WinBook's DX4-100 entry this month is a winner in many respects. For one thing, it's a speed demon that produced great test results, finishing our benchmarks faster than a typical DX4-100 notebook—this makes it one of the fastest notebooks you can buy for under $3000. It comes with some nice features, such as a roomy 520MB hard disk, a large 10.3-inch dual-scan color screen, and a built-in 14.4-kbps fax-modem—quite a few components to squeeze into a notebook. The WinBook XP DX4-100 8/520 Dual-Scan, which has a total traveling weight of 7.4 pounds, also includes 8MB of RAM and a PC Card Type III slot. The PC Card slot can alternatively accommodate two Type II cards. The keyboard and the pointing device (your choice of either a trackball below the <Space> bar or a minijoystick mounted among the keys) are comfortable to use, and the battery lasts a respectable 3.5 hours on a charge. Support policies aren't bad, either. The one-year warranty is meager, but you do get a 30-day money-back guarantee, 11 hours of tech support a day along with Saturday hours, and the company's promise to turn around factory repairs within three days. Can you believe you can get all this for $2799? Small wonder the WinBook ended up high in the power section of our Notebook PCs Top 20.

WinBook

AT&T Globalyst 250

REVIEWED: April 1995

PROS: Fastest DX4-75 notebook yet, good design, strong reliability-and-service record

CONS: The $5154 price is on the high side, the 8.6-pound traveling weight is rather heavy

Compaq LTE Elite

REVIEWED: October 1994

PROS: Decent DX4-75 performance, first-rate design and screen, 6.5-hour battery life, PC Card hot-swapping, Plug and Play compatible, 7.2-pound traveling weight, great support

CONS: Innovative trackball placed in screen panel was inconsistently responsive

Austin Business Audio 4/100

REVIEWED: December 1994

PROS: Fast DX4-100 performance, 16MB of RAM, 500MB hard drive, fast fax-modem

CONS: So-so 3-hour battery life, active-matrix screen has unusually muted colors

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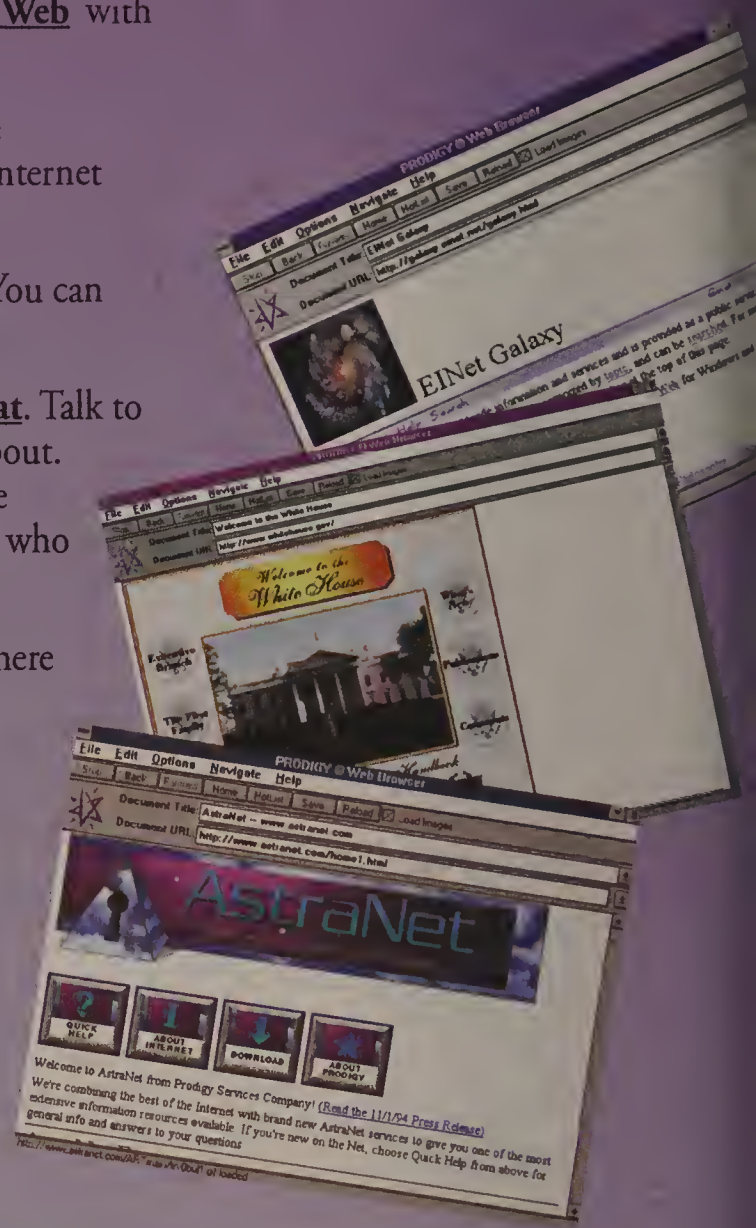

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8 Toshiba T4850CT

REVIEWED: March 1995

PROS: Good DX4-75 performance, fine active color display, 4.3-hour battery life, super support

CONS: High $5274 price for a DX4-75, 8.4-pound traveling weight is heavy for a notebook

9 MidWest Micro Elite Pentium SoundBook Plus

REVIEWED: April 1995

PROS: This Pentium-90 notebook is one of the fastest we've ever tested, big hard disk

CONS: Steep $5599 price, 8.2-pound traveling weight, pointing device is a little difficult to use

10 Toshiba Satellite Pro T2450CT

NEW THIS MONTH

PROS: Great performance, active-matrix color screen, excellent documentation

CONS: None

Kudos go to Toshiba's latest. Its $4099 price is high, but the Satellite Pro T2450CT is class all the way. For starters, this DX4-75 notebook finished our application tests well ahead of the average system in its class. And it features a 9.5-inch active-matrix color display, a 320MB hard drive, and two PC Card slots (a Type II and a Type III). Nestled among the keys is a minijoystick pointing device that works stiffly but accurately, and the keys' quiet click means you won't annoy your neighbors on an airplane. The battery lasted a decent 3.8 hours in our endurance test. The total traveling weight of the Satellite Pro is a quite manageable 7.6 pounds.

Toshiba

The notebook's manual is well organized and comprehensive, and Toshiba preinstalls a hypertext copy of it on the PC. The company's outstanding support includes a three-year warranty, 24-hour tech support seven days a week, and a fast two-day turnaround policy on factory repairs—we've received very favorable comments from Toshiba owners on our ongoing reader fax-back survey. With plenty of power, decent features, and great service, the Toshiba Satellite Pro T2450CT is the latest of many Toshiba notebooks to earn a place in the ranks of the Notebook PCs Top 20.

Budget Notebooks

1 WinBook XP SX-33 Monochrome

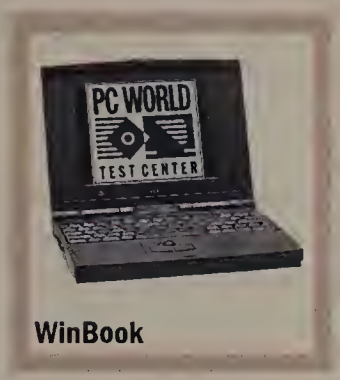
NEW THIS MONTH

PROS: Best battery life we've seen, 14.4-kbps fax-modem, fast for a 486SX-33 notebook

CONS: Monochrome display, one-year warranty is short for a computer these days

How does an SX-33 monochrome notebook earn our top recommendation for a budget notebook?

Well, the $1859 WinBook XP SX-33 Monochrome excels in so many other ways. For one, its 8.8-hour battery life is the longest we've ever seen. For another, this lithe 6.8-pounder fared very well in our tests, keeping up with most of the DX2-50s we've had on the bench. The company doesn't skimp on features, either: You get 8MB of RAM, a 14.4-kbps fax-modem, a 260MB hard disk, and a PC Card Type III slot that can alternatively accept a pair of Type II cards. The WinBook XP SX-33 Monochrome even boasts a comfortable keyboard and offers something rare among notebooks: your choice of pointing device—a keyboard-mounted minijoystick or a front-and-center trackball.



WinBook

The WinBook's good documentation is backed by solid support policies. While the one-year warranty is considered short for today's systems, you do get a 30-day money-back guarantee and 11 hours of toll-free tech support during the work week (with another 7 hours on Saturdays). In short, the WinBook XP SX-33 Monochrome is the best bargain in a budget notebook you can find if you can do without color.

2 WinBook XP DX2/50

REVIEWED: February 1995

PROS: Exceptional battery life, choice of pointing device, lightweight, low price

CONS: Can't hot-swap battery, one-year warranty could be better

Monochrome screen helps this $1995 DX2-50 notebook run for a marathon 6.8 hours. Light 6.8-pound system is a decent performer and includes a 14.4-kbps internal fax-modem, a 260MB hard drive, and 8MB of RAM expandable to 32MB.

3 Dell Latitude 450C

REVIEWED: January 1995

PROS: Fast for a DX2-50 notebook, light 7-pound traveling weight, high-speed fax-modem, great documentation, excellent service-and-reliability ratings on reader fax-back survey

CONS: One-year warranty doesn't compare well with other top vendors' coverage periods

4 WinBook XP DX4-75 8/520/TFT

REVIEWED: December 1994

PROS: Low $2699 price, comfortable 7-pound traveling weight, 5.7-hour battery life, hard drive increased to 520MB, choice of trackball or minijoystick pointing device, good documentation

CONS: Can't hot-swap battery, one-year warranty is brief coverage for current systems

5 Dell Latitude 475C

NEW THIS MONTH

PROS: Strong performance, removable floppy drive, great service-and-reliability ratings

CONS: One-year warranty is the minimum coverage period for PCs today

Dell's latest is a lot of little PC for the money—you'd be hard-pressed to find more notebook for $2729. This 7.2-pound system is uncommonly fast for a DX4-75 and is, in fact, one of the most powerful budget notebooks you can buy. It comes well stocked: You get 8MB of RAM, a removable 330MB hard drive, and a 9.5-inch dual-scan color screen, plus a PC Card Type III slot and a removable floppy drive that can be replaced with a second battery. Battery life is average—a little over 3 hours. The trackball and

Dell

keys for the front-and-center pointing device are mounted close together, and that area may be too cramped for some users. However, the keyboard has a solid feel and is comfortable and quiet. Support policies are modest in places—the one-year warranty is short, for example—but the Latitude comes with around-the-clock tech support and great documentation, and our readers rank Dell's service and reliability as among the best in the industry. With all this going for it, the 475C is a shoo-in for our Notebook PCs Top 20.

6 Acom Patriot 4000 DX4-100

NEW THIS MONTH

PROS: Inexpensive, great performance, large dual-scan color screen, 14.4-kbps fax-modem

CONS: Short 2.8-hour battery life, hefty 8.4-pound traveling weight, short one-year warranty

Acom's latest Patriot proves you can't judge a book by its cover. At 8.4 pounds and with a larger-than-usual frame, this SlimFast-diet candidate doesn't make a good first impression. Also, we weren't thrilled with its short 2.8-hour battery life. We expect to see at least 3 hours from a battery pack on current notebooks.

But it's amazing what you get for the money. The portly Patriot 4000 DX4-100 is *fast*, outpacing most of its DX4-100 peers in our tests. It comes with a giant (for a notebook) 520MB hard disk and a 14.4-kbps PC Card fax-modem. The screen is a luxurious 10.3 inches and provides fairly crisp dual-scan color. Not only that, but you also get internal sound complete with microphone and speakers. If you have to have longer battery life, you can swap the floppy drive for a second pack. Finally, the notebook is backed by solid if slightly spare support policies, including a one-year warranty and 10 hours of toll-free technical help on weekdays. You'd expect to pay $3500 for all this, right? Try $2725—which puts the Patriot 4000 DX4-100 in our budget category and places it solidly on our Notebook PCs Top 20 chart.

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7 Austin Business Audio 4/75

REVIEWED: February 1995

PROS: Decent DX4-75 performance, audio, near 4-hour battery life, 24-hour tech support

CONS: One-year warranty, 8.2-pound traveling weight, limited power management

8 Sceptre SoundX Series 1000

NEW THIS MONTH

PROS: Fast for a DX2-66 notebook, low price, large dual-scan color screen, integrated audio

CONS: Short battery life, poor display quality, brief one-year warranty, short tech support hours

Sceptre Technologies' latest is quite a notebook for the price. This $1795 DX2-66 stormed through our tests, posting scores right up there with the typical DX4-75 notebook, and it comes with a large 340MB hard drive and a PC Card Type III socket, which can alternatively accept two Type II cards. The SoundX also includes 16-bit audio, an internal speaker, and jacks for external speakers and a microphone. Some users may find the front-and-center trackball a little small, but its control is quite good and we had no problem with runaway screen pointers. The keyboard is very quiet and comfortable to use.

Sceptre

Caveats? The nickel–metal-hydride battery lasts for only 2.5 hours on a charge. Also, the large 10.3-inch dual-scan color screen is very streaky, and there's a generally uneven quality to the display. In addition, Sceptre Technologies trails major vendors in its service-and-support policies, offering a meager one-year warranty and technical support availability of only 9 hours per weekday. The Sceptre SoundX Series 1000 isn't the perfect notebook, but it has a potent combination of quick performance and eye-catching price.

9 Acom Patriot 4000

REVIEWED: March 1995

PROS: Great DX2-66 performance, low $2190 price, audio, 10.3-inch passive color screen

CONS: Dull screen colors, 8.4-pound traveling weight, no set turnaround policy on repairs

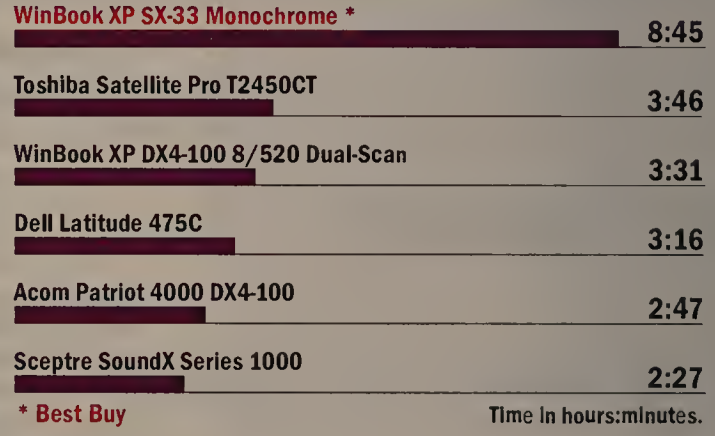
10 CTX EzBook DX2-50

REVIEWED: March 1995

PROS: Solid DX2-50 speed, excellent $1958 price, 7.2-pound traveling weight

CONS: Monochrome screen, technical support hours are relatively short

Battery Life



Methodology
We drain and fully recharge the battery and set power-saving options to match a consistent profile where possible. Office workers type at regular intervals in Word for Windows, saving periodically. Notebooks are rotated among workers to even the workloads. We report the time elapsed until the notebook shuts itself off.

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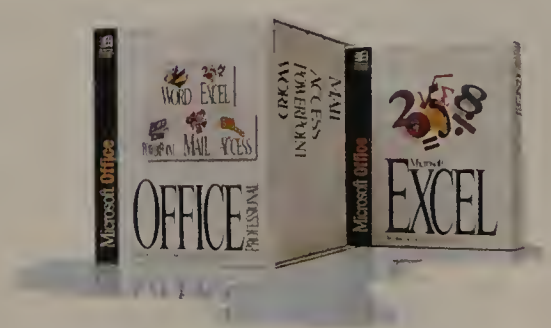

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FEATURES COMPARISON This Month's Contenders—Desktops

● = Yes ○ = No n/a = not applicable

Standard features	Dell OptiPlex XMT 5100	DFI Diamond P100	Diamond DX4-100	Digital Celebris XL590	Micro Express MicroFlex-VL/104	Polywell Poly 486-100VP4
Street price as of 1/30/95 [1]	$4059	$3495	$1995	$5522	$1699	$1950
CPU	Pentium-100	Pentium-100	AmDX4-100	Pentium-90	AmDX4-100	AmDX4-100
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	237-pin ZIF	320-pin ZIF	237-pin ZIF	237-pin ZIF
BIOS	Phoenix 12/2/94	AMI 8/23/94	Award 8/26/94	Phoenix 11/22/94	AMI 7/25/94	Award 11/8/94
Installed/maximum RAM (MB)	16/128	16/128	16/128	16/384	16/64	16/128
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	4/2	4/2	4/3	6/4	6/5	4/3
Secondary RAM cache installed/maximum (K)	256/256	256/256	256/256	256/1024	256/512	256/512
Case style	tower	tower	compact	tower	minitower	minitower
Free externally accessible 3½-inch/5¼-inch drive bays	0/2	0/3	0/2	0/1	1/2	1/2
Free internal 3½-inch/5¼-inch drive bays	1/0	1/2	0/0	1/0	0/0	1/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots	0/6/0 [2]	0/3/0 [3]	0/2/0 [3]	0/4/0 [3]	0/3/1	0/2/0
PCI or VL bus slots/number free	2 PCI/2 [2]	3 PCI /2 [3]	4 PCI/3, 1 VL/0 [3]	3 PCI/2 [3]	3 VL/0	4 PCI/3, 1 VL/0
Hard disk	WD Caviar 31000	WD Caviar 31000	Conner CFA540A	Seagate ST31230N	WD Caviar 2540	Seagate ST5660A
Size (MB)	1080	1080	540	1010	540	500
Adapter	integrated	integrated	Promise EIDE 2300 Plus	integrated	Promise DC4030VL-2	integrated
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	S3 Vision 864	DFI WG-3000P	ATI WinBoost	Diamond Stealth 64	ATI WinBoost	Diamond Stealth 64
Installed VRAM/DRAM (MB)	0/2	0/2	0/2	2/0	0/2	0/2
Monitor	Dell UltraScan 15TE	ADI Microscan 5AP	Sceptre CC615GL-1	Digital VRT17-HA	Micro Express FM 590	Socos DCM-1488E
Screen diagonal (inches)/dot pitch (mm)	15/.28	17/.26	15/.28	17/.26	15/.28	14/.28
Modem speed for fax/data (kbps)	n/a	14.4/14.4	n/a	n/a	n/a	n/a
Sound board	n/a	Mozart 16	Super 16 Bit Sound Card	n/a	n/a	Creative Labs Sound Blaster 16
CD-ROM drive	NEC CDR-260 R	Mitsumi CRMC-FX400	Mitsumi CRMC-FX001DE	Toshiba XM-5201B-S	Sony CDU55E	Sony CDU334A-01
Data transfer rate (K/sec)	300	300	300	300	300	300
Parallel/serial/mouse/SCSI ports	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/1	1/2/0/0	1/2/0/0
Service and support						
Warranty (years)	3	2	2 [4]	3	2	5 [5]
30-day money-back guarantee	●	○ [6]	●	●	●	●
On-site service first-year price	free	$58	$75	free	free	$75
Repair turnaround policy (days)	○	2	2	2	2	3
Daily toll-free phone support (hours)	24	9.5	9	24	9	24
Weekend support	●	○	● [7]	●	● [8]	● [7]
BBS	●	●	●	●	○	●
Fax	●	●	○	●	●	●

BEST BUY

[1] All systems priced as configured with DOS 6.0 or later version, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] Two less 16-bit slots available when all PCI slots are filled, and vice versa.

[3] One less 16-bit slot available when all PCI slots are filled, and vice versa.

[4] 15 months parts, 24 months labor.

[5] Two years parts, five years labor.

[6] Five-day money-back guarantee.

[7] Saturdays only.

[8] For weekday evenings and weekends, support is a toll call; you must leave messages for callbacks.

USA Flex DX4/ 100 Desktop	USA Flex PT90 MidTower
$2199	$3999
DX4-100	Pentium-90
237-pin ZIF	320-pin ZIF
Award 11/24/94	AMI 8/23/94
16/64	16/128
72-pin	72-pin
6/5	4/2
256/512	256/256
compact	tower
2/1	2/1
1/0	1/0
0/3/0	0/3/0 [3]
3 VL/0	3 PCI/2 [3]
WD Caviar 2700	WD Caviar 31000
730	1080
Promise EIDE 2300 Plus	integrated
combo	combo
Paradise Bahamas 64	ATI Graphics Pro Turbo
0/2	4/0
CTX 1565GM	Mag DX 17F
15/.28	17/.26
14.4/14.4	14.4/14.4
Sun Moon Star 16	Creative Labs Sound Blaster 16 MCD-RIO
Sony CDU55E	TEAC CD-55A-B
300	600
1/1/0/0	1/2/0/0

3	3
●	●
$49	$49
3	3
24	24
●	●
●	●
●	●

System Snapshots

These desktops and notebooks were tested and reviewed along with the others, but didn't score high enough to reach the Top 20 charts.

Alaris Cian

PROS: Competitive price, upgradable to a full Pentium or NexGen processor, long three-year warranty

CONS: Small hard drive, minimally configured

You can upgrade this bargain-priced $1725 DX2-66 compact desktop to a Pentium or NexGen processor. However, the Alaris Cian's feature set—including a small 280MB hard disk and no multimedia capabilities—is a bit too skimpy even for the system's low price. *Alaris, 800/317-2348, 510/770-5700* **Reader service no. 752**

Aquiline Cyclone

PROS: CD-ROM drive, built-in audio, great five-year warranty

CONS: Toll call for technical support, heavy for a notebook

The Aquiline Cyclone provides you with an integrated CD-ROM drive and other multimedia components, DX4-100 speed, a dual-scan passive color screen, and a 324MB hard drive—not bad for $3795. But this notebook's so-so 3-hour battery life and heavy 8.8-pound weight kept it off our Notebook PCs Top 20 chart. *Aquiline Inc., 800/370-3322, 518/272-0421* **Reader service no. 753**

ArmNote TS30PT

PROS: Lightning fast, built-in audio, wireless infrared links with peripherals that support the same wireless standard

CONS: Expensive, heavy, short battery life, one-year warranty

This 90-MHz Pentium totable is the fastest notebook we've tested so far, and it comes with a great active-matrix color screen. However, the ArmNote TS30PT's 8.2-pound weight and 2-hour battery life reduce mobile usability, and the $5399 price is high. *Arm Computer, Inc., 800/765-1767, 408/428-9800* **Reader service no. 754**

AT&T Globalyst 515

PROS: Three-year warranty, strong service-and-reliability record based on our ongoing reader fax-back survey

CONS: High price, below-average performance

AT&T offers reliable computers that are backed by top-notch support. However, this $2465 DX4-100 compact desktop's components are ho-hum, and its performance is subpar for its processor class. You can find more PC for your money elsewhere. *AT&T Global Information Solutions, 800/447-1124, 513/445-5000* **Reader service no. 755**

Austin Power System 75

PROS: Speedy, great documentation, decent support

CONS: None

This Pentium-75 minitower system outperformed the typical desktop in its processor class, and it comes with a CD-ROM drive, great documentation, and solid support. Had this $2299 computer cost a little bit less, it might have made our Budget Desktops Top 20 chart. *Austin Direct, 800/752-1577, 512/339-3500* **Reader service no. 756**

Canon InnovaBook 150C

PROS: Removable floppy drive, good documentation

CONS: Heavy 8.4-pound weight, one-year warranty

The Canon InnovaBook 150C is a reasonably priced DX2-66 notebook that performs like a champ, and its 9.5-inch dual-scan color screen and 340MB hard drive are attractive features for the price. This slightly portly $2600 unit almost made it onto our Notebook PCs Top 20 chart. *Canon Computer Systems, Inc., 800/848-4123, 714/438-3000* **Reader service no. 757**

Dell Latitude XP 100MHz System

PROS: Very long battery life, excellent service and support

CONS: None

Here's a notebook with a great 7-hour battery life, solid DX4-100 speed, a 340MB hard disk, and a 9.5-inch dual-scan color screen, all backed by good support policies and an excellent service-and-reliability record—this $3699 portable didn't miss the power section of our Notebook PCs Top 20 chart by much. *Dell Computer Corp., 800/289-3355, 512/338-4400* **Reader service no. 758**

DFI Diamond P75

PROS: Quad-speed CD-ROM drive, plenty of bundled software

CONS: Scant system documentation, very short five-day money-back guarantee, short technical support hours

Fast 75-MHz Pentium performance, multimedia components including a quadruple-

FEATURES COMPARISON This Month's Contenders—Notebooks

● = Yes ○ = No
n/a = not applicable

Standard features	Acom Patriot 4000 DX4-100	Dell Latitude 475C	Sceptre SoundX Series 1000	Toshiba Satellite Pro T2450CT	WinBook XP DX4-100 8/520 Dual-Scan	WinBook XP SX-33 Monochrome
Street price as of 1/30/95 [1]	$2725	$2729	$1795	$4099	$2799	$1859
CPU	DX4-100	DX4-75	486DX2-66	DX4-75	DX4-100	486SX-33
Traveling weight (pounds) [2]	8.4	7.2	7.8	7.6	7.4	6.8
Width x depth x height (inches)	11.5 x 9 x 2.2	10.5 x 9.8 x 1.8	11 x 8.8 x 2	12 x 8.8 x 2.5	11.5 x 8.9 x 2	11.5 x 8.8 x 1.8
Installed/maximum RAM (MB)	8/32	8/20	8/20	8/32	8/32	8/32
Secondary RAM cache installed/maximum (K)	0/0	0/0	0/0	0/0	0/0	0/0
Installed/maximum hard disk (MB)	520/520	330/520	340/540	320/500	520/520	260/520
Removable hard disk	●	●	●	○	●	●
Display type	color dual-scan	color dual-scan	color dual-scan	color active	color dual-scan	mono passive
Screen diagonal (inches)	10.3	9.5	10.3	9.5	10.3	9.5
Maximum colors or gray shades of LCD	256	256	256	256	256	64
Simultaneous LCD and external monitor	●	●	●	●	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768	1024 x 768
Mouse/keyboard ports	0/1	1/0 [3]	1/0 [3]	1/1	1/0 [3]	0/1
Cursor keys in inverted T	●	●	●	●	●	●
Dedicated page-control keys	●	○	●	●	●	●
All 12 function keys dedicated	●	●	●	●	●	●
Standard <Ctrl> and <Alt> layout	○	○	○	○	○	○
Built-in pointing device	●	●	●	●	●	●
Modem speed for fax/data (kilobits per second)	14.4/14.4	n/a	n/a	n/a	14.4/14.4	14.4/14.4
Docking station available	●	○	●	●	●	●
PC Card (PCMCIA) slot Type II/III	0/1 [4]	0/1 [4]	0/1 [4]	1/1 [4]	0/1 [4]	0/1 [4]
Power management						
Supports APM	●	●	●	●	●	●
Type of battery	NiMH [5]	NiMH [5]	NiMH	NiMH	NiMH	NiMH
Suspend button	●	● [6]	●	○	●	●
Suspends when case closed	●	○	○	●	○	●
Service and support						
Warranty (years)	1	1	1	3	1	1
30-day money-back guarantee	●	●	○	○	●	●
On-site/replacement service first-year price	○	free	○	$50	○	○
Repair turnaround policy (days)	2	2	2	2	3	3
Daily toll-free phone support (hours)	10	24	9	24	11	11
Weekend support	○	●	○	●	● [7]	● [7]
BBS	●	●	●	●	●	●
Fax	●	●	●	○	●	●

BEST BUY

[1] All notebooks priced as configured with DOS 6.0 or later version, Windows 3.1, VGA monochrome or better display, and mouse or other pointing device. Price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, and external floppy drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Type III slot alternatively holds two Type II devices.

[5] Dual-battery option.

[6] Suspends with key combination.

[7] Saturdays only.

TCP/IP Applications For Windows.

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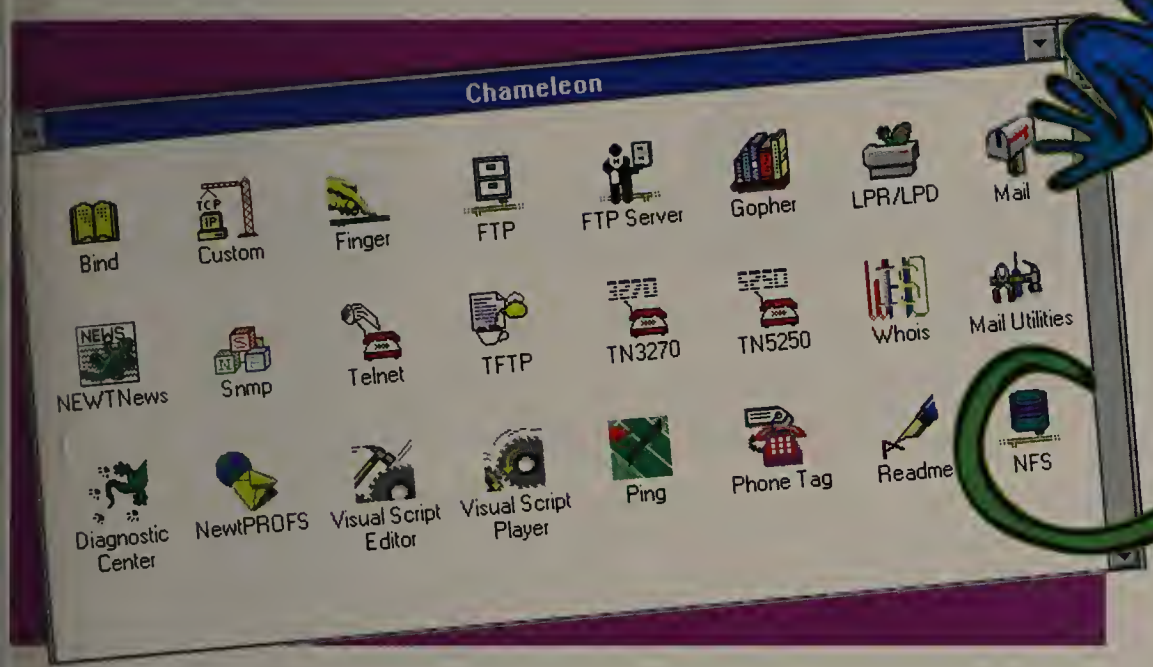

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  - Visual Script Editor & Player
- File Transfer
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- File & Printer Sharing
  - NFS Client & Server; LPR/LPD
- Electronic Mail
  - SMTP Mail with MIME
  - Phone Tag
  - IBM PROFS
  - POP2, POP3, SMTP
- Internet Access
  - Gopher
  - Newsreader
  - Whois
- Network Utilities
  - Ping
  - Finger
  - Diagnostic Center/Trace Agent
  - DNS Client & Server
- WinSock TCP/IP
  - 100% DLL TCP/IP Stack
  - Windows install and setup
  - LAN: Ethernet, Token Ring
  - Dialup: SLIP, CSLIP, PPP & ISDN

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Adaptec 2940W
Sony 4x CD ROM
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DOS & Windows for Workgroup
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SLOTS: (2) PCI, (5) EISA, (1) Shared
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speed CD-ROM drive, a 15-inch monitor, a 14.4-kbps fax-modem, and plenty of software—a remarkable deal for $2249 and one that nearly put this compact on our Budget Desktops Top 20 chart. *DFI, 800/275-3342, 916/568-1234* **Reader service no. 759**

Digital HiNote CT 450

PROS: Strong performance, good battery life, excellent service-and-support policies

CONS: The most expensive DX2-50 notebook available

The Digital HiNote CT 450 is a DX2-50 active-matrix color notebook, but it runs like a typical DX4-75. Also, it has a long 4.5-hour battery life and great support policies. The PC's stiff $4298 price is the main thing that stands between it and the Notebook PCs Top 20. *Digital Equipment Corp., 800/722-9332, 603/884-4304* **Reader service no. 760**

Duracom DeskSaver 586Nx-100

PROS: Extremely fast, 16MB of RAM, decent price

CONS: 14-inch screen, one-year warranty are minimums

Using the NexGen 586-P100 processor, this compact desktop keeps up with most computers based on Intel's Pentium-100 CPU. But for $3499, we expected the DeskSaver 586Nx-100 to come with a larger monitor and more robust support policies. *Duracom Computer Systems, 800/551-9000, 214/518-1200* **Reader service no. 761**

Epson ActionNote 650C

PROS: Inexpensive, large screen, good documentation

CONS: Slow, no guaranteed turnaround time on repairs

Epson America fields a nice low-cost totable—$2278 gets you 8MB of RAM, a 250MB hard drive, a 10.3-inch dual-scan color screen, and 4.5 hours of battery life. Subpar speed, however, kept this Cx-486DX2-50 notebook off the Notebook PCs Top 20 chart. *Epson America, 800/289-3776, 310/782-5478*

IBM ThinkPad 360CSE

PROS: Lots of preinstalled software, excellent support

CONS: One-year warranty, short battery life, small hard drive

This DX2-50 passive color notebook's decent $2649 price and good performance, plus IBM's legendary support and reputation for making reliable systems, make this an attractive package. But the one-year warranty, the 2.5-hour battery life, and the 170MB hard drive are real drawbacks. *IBM, 800/772-2227, 914/766-1900*

Intelesys Star 75

PROS: Nice price, Pentium-75 speed, multimedia

CONS: Interior is a bit crowded

Good Pentium-75 speed and expandability, a 730MB hard disk, multimedia, a fax-modem, and decent service-and-support policies—the $2349 Intelesys Star 75 tower has a lot going for it. However, it's not enough to push this system onto our Top 20 charts. *Intelligent Computers and Technologies, 800/577-2486, 510/226-6300* **Reader service no. 762**

MidWest Micro Elite 486DX4-100 Office PC

PROS: Three-year warranty, large hard drive, lots of software

CONS: None

This $2194 minitower is quite a good value for a budget system: You get solid DX4-100 speed, a roomy 850MB hard disk, a CD-ROM drive, a 14.4-kbps fax-modem, and Word, Encarta, Works, Money, and Bookshelf. *MidWest Micro, 800/728-8582, 513/368-2309* **Reader service no. 763**

MIS M54P

PROS: Very fast, excellent expandability, affordable

CONS: One-year warranty is minimal coverage period

MIS's $2603 Pentium-90 tower computer offers you excellent performance and has great expandability, including ten free drive bays. But the lack of extra features—such as a CD-ROM drive—and its short warranty keep it from our Top 20 lists. *MIS, 800/733-9188, 510/226-9188* **Reader service no. 764**

MIS M5Pi

PROS: Low price for a Pentium-60 desktop computer

CONS: No free drive bays, 14-inch monitor is small

This 60-MHz Pentium compact desktop is fast and has a nice-size 540MB hard disk and a low $2022 price. Still, the MIS M5Pi is too sparsely appointed—a small screen, no CD-ROM drive, and no free drive bays—for it to earn a place on our Budget Desktops Top 20 chart. *MIS, 800/733-9188, 510/226-9188* **Reader service no. 765**

MPC CD-Book

PROS: CD-ROM drive, built-in speakers and microphone, comes with a number of CD-ROM titles

CONS: Dim screen, very short battery life, one-year warranty

What's next? Check out our sneak previews of 120-MHz PCs from major vendors in this month's Top of the News.

The $2750 price buys a lot of DX2-50 notebook from MPC: multimedia components, a 340MB hard drive, and good speed for its processor class. However, a battery life below 2 hours and a pale passive color screen keep the CD-Book well off our Top 20 chart. *MPC Technologies, Inc., 800/672-8990, 714/724-9000* **Reader service no. 766**

Panasonic V-41

PROS: Very fast, multimedia configuration, large screen

CONS: Very expensive, very heavy, short one-year warranty

This DX4-100 notebook gives you Pentium-66 speed and includes a CD-ROM drive, a sharp 10.4-inch active-matrix color screen, and a decent 3.5-hour battery life. However, the system's 11.4-pound weight and $7099 price keep it far off the Notebook PCs Top 20. *Panasonic Personal Computer Company, 800/742-8086, 201/271-3182* **Reader service no. 767**

Sceptre SoundX Series 3000

PROS: One of the fastest notebooks you can buy, large 10.4-inch active-matrix color screen, built-in sound

CONS: Minimal one-year warranty, short 2-hour battery life

The $3995 Sceptre SoundX Series 3000 is blazingly fast, as you would expect a Pentium-90 notebook to be, and it comes with a large active-matrix color screen. However, its 2-hour battery life falls far short of what users expect from a notebook these days. *Sceptre Technologies, 800/788-2878, 818/369-3698* **Reader service no. 768**

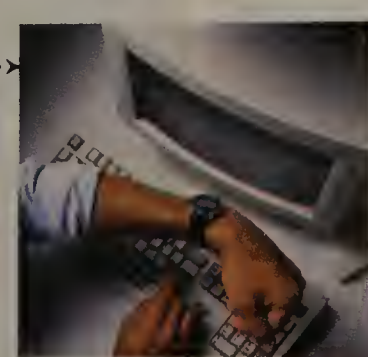
A product with one of the highest *"You're kidding me"* scores ever recorded.

The reaction is almost always the same: you tell someone about this new watch that can read your personal schedule right off a computer screen, and they look shocked for a moment, then shake their heads. "No, c'mon," they protest, "what does it *really* do?"

Well, it's the honest truth. All you need is a Timex Data Link watch and the included software, a PC loaded with Microsoft® Windows™ 3.1 or later, and a CRT monitor. Then just push a few buttons, and hold the watch in front of your monitor. The screen will flash lines of light, and in seconds the watch's electronic eye will read up to 70 entries from the Microsoft and Timex Data Link software: appointments, phone numbers, alarms, to-do lists, birthdays, anniversaries, even locker combinations.

The Timex Data Link watch: it's like science fiction, but without the fiction.

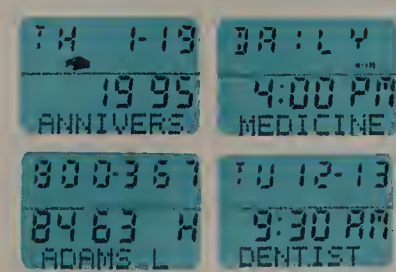
The Timex Data Link watch can actually read your personal information right from your computer screen.



Presto, everything is now right there in your watch, as portable as the arm you wear it on.

A week before a birthday or anniversary, a little hand with a string around the forefinger appears on the watch face (*Get outta here!*– no, really, it does) as a reminder icon. Then on the actual day itself, the icon flashes urgently. Or when an appointment nears, the watch beeps to alert you, then tells you who you're supposed to meet, and where.

If this all seems a bit much to believe, we encourage you to examine this remarkable watch with your own eyes, or call 1-800-367-8463 for information. You'll see that everything we've told you is true. Seriously. No lie. Scout's honor. No kidding.



The Indiglo night-light makes sure you're never left in the dark.

TIMEX DATA LINK WATCH

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Circle 236 on reader service card

HOT!

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17691 IBM
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18994 NOVELL
Netware 4.1 CD-ROM 5 User $649

19352 SOFTKEY
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5785	CheckMark Payroll—Windows	79.95
13156	Clear Software allCLEAR—Win	179.95
17383	Envelope Manager DAZ-zle Plus	39.95
17007	Gold Disk Video Director—Win	99.95
14922	IdeaFisher—Windows	95.00
6733	Inspiration—Windows	129.95
2426	Intuit Quicken—DOS	42.95
3517	Intuit TurboTax—Windows	39.95
16536	Lotus Ami Pro 3.1 *(w/$30 rebate)*	69.95
15978	Lotus Approach 3.0 *(w/$20 rebate)*	79.00
19774	Microsoft Office for Win. 4.2	479.95
17693	Microsoft Win. NT 3.5 Wkstn	295.95
5743	Microsoft Win. for Wrkgrps 3.11	139.95
7811	Microsoft Word for Win. 6.0	299.95
19400	MS Works—Win *(w/free Money)*	87.95
14617	NEBS One Write Plus 4.5	49.95
5426	Shapeware Visio 3.0—Win	129.95
4402	Soft Pub Harvard Graphics—Win	279.95
10901	SoftKey A H Dictionary Talking CD	38.95
7435	Symantec ACT! 2.0 for Windows	189.95
12914	WordPerfect 6.1 for Windows	279.95
18240	WP Perfect Office 3.0	449.95

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16899	Diamond Stealth 64	$369.95
17316	Magnavox 17" CM4017 Monitor	699.95
18412	Matrox Impression LITE VLB 2M	359.95
13054	NEC MultiSync 2V 14" Monitor	329.95
17195	NEC MultiSync XE 15" Monitor	569.95

GRAPHICS

13109	Adobe Illustrator & Photoshop	$629.95
16661	Adobe Photoshop 3.0	569.95
13791	Aldus PageMaker 5.0	579.95
9943	Aldus Persuasion 3.0	324.95
7850	Corel Gallery CD-ROM Windows	39.95
2618	Corel DRAW! 3.0 CD-ROM	69.95
8498	Corel DRAW! 5.0 CD-ROM	489.95
16961	Fractal Design Painter 3.0—Win	349.95
19880	HSC Convolver Windows	129.95
13956	HSC KPT Windows	129.95
1085	Macromedia FreeHand Windows	399.95
10524	Micrografx ABC Flow Charter	329.95
17800	Micrografx Picture Publisher 5.0	279.95
6992	North Coast PhotoMorph 2.0–Win	99.95

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17310	Cirque Glide Point	$79.95
16889	HP DeskJet 540 Printer	299.00
16658	Microsoft Home Mouse	39.95
5187	Microtek ScanMaker II	479.00
16811	Polaroid SprintScan	1999.00
16151	UMAX BizCard Reader	199.95
16152	UMAX ScanThis Color Scanner	199.95

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3858	APC Back-UPS 400 Power Backup	$149.95
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16891	Improve Make-it a 486	229.95
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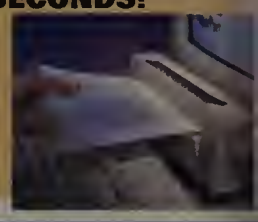

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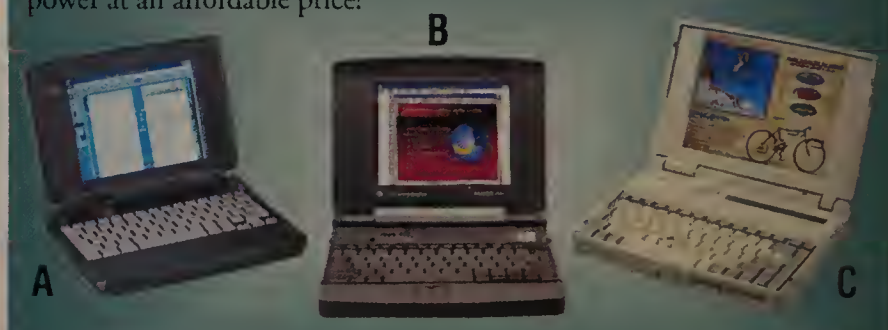

A	15749	Compaq Aero 433C-170	$1499
B	18697	Texas Instruments T4000M/50 DX2/340 Dual Scan Color	2139
C	17950	Toshiba T4900CT/810 Pentium	6351

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11303	Symantec pcAnywhere 2.0–Win.	134.95
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16926	Allied Telesyn 8Prt 10BASE-T Hub	$144.95
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19482	Altec Lansing ACS51	$79.95
3226	C. Labs Sound Blaster Pro Value Ed.	79.95
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17618	Microsoft Encarta '95 for Win. CD	87.95
17448	Passport Design MusicTime 2.0	89.95
17348	WordPerfect Paper Planes	24.95
16622	WordPerfect Read w/ Me CD 1&2	49.95

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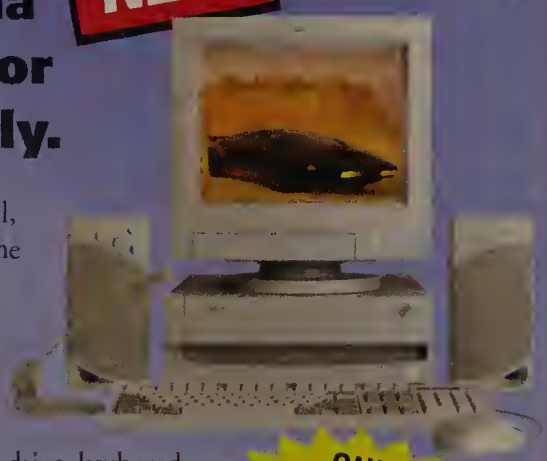

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7841	Microsoft Word 6.0 for Win. *(Version)*	$119.95
11336	Microsoft Office for Win. 4.2	$279.95
17954	Symantec pcAnywhere Win. 4.2 *(Version)*	$59.95
18261	WordPerfect Perfect Office 3.0 *(Version) (while supplies last)*	$189.95
17230	WordPerfect Quattro Pro 6.0 *(Version)*	$49.95
12963	WordPerfect 6.1 for Windows *(Version)*	$92.95
8593	CorelDRAW 5 – CD-ROM	$189.95

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"Sets the new notebook standard for others to match"
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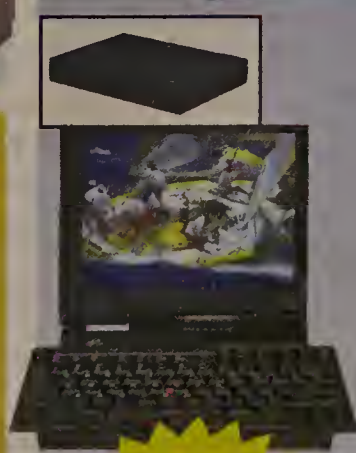

Weighing in at a mere 4.5 pounds, the IBM **ThinkPad 701C and 701CS** feature a full-sized 85-key **TrackWrite Keyboard** with the **TrackPoint III** pointing device. And you don't sacrifice an ounce of power or versatility.

Fully Equipped!
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20167	**IBM ThinkPad 701CS Dual-Scan Color** 50MHz, 360MB Drive	**$4499.**
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20168	**IBM ThinkPad 701C Active Color** 50MHz, 540MB Drive	**5849.**

ZDS Z-Star EX DX2-50

PROS: Lightweight, speedy, modular design, long battery life

CONS: One-year warranty is the minimum coverage on a PC

ZDS's latest Z-Star portable nearly ascended to the Top 20 chart. The Z-Star EX DX2-50 has an attractive feature set, including a respectable 4.3-hour battery life, a light 6.6-pound weight, decent performance for its processor class, and a bright 9.5-inch dual-scan screen that offers exceptionally rich images with over 65,000 colors. Plus, ZDS's unit is backed by around-the-clock technical support and free on-site service for the first year. When you consider that you get all this for only $2508, the Z-Star EX DX2-50 is an excellent value in a budget notebook. *Zenith Data Systems, 800/533-0331, 708/808-5000* **Reader service no. 769**

Zeos Pantera Pentium-100

PROS: Good price, big hard disk, generous 16MB of RAM

CONS: Slow for a Pentium-100, sound is only 8-bit

$3595 is a good price for a decked-out Pentium-100 computer with a 1GB hard disk, a CD-ROM drive, 16MB of RAM, and good expandability, but this full tower is slow for its class. *Zeos International, 800/554-5220, 612/362-1234* **Reader service no. 770**

TEST REPORT This Month's Contenders

BEST BUY

Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from seven tests. A system may have a better overall performance rating than another system that took less time to complete our test suite.

Methodology

We tested each system as supplied by the manufacturer, using the version of DOS supplied. If we installed Windows, we used the default installation. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows

We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0

We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows

We used a custom form to add a moderate number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows

We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; then previewed and saved it.

WordPerfect 6.0 for DOS

We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS

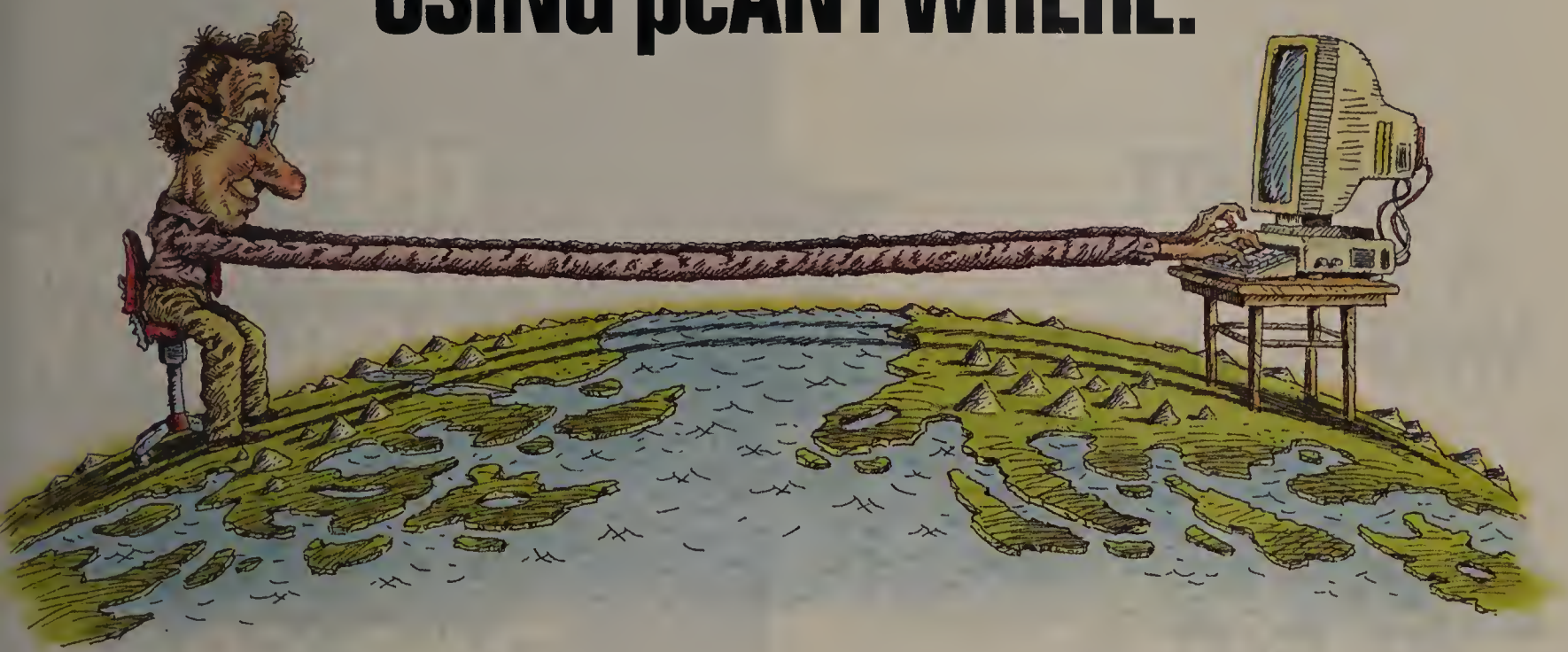
Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS

We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

IF YOU THINK REMOTE COMPUTING IS A HASSLE, YOU'RE PROBABLY NOT ONE OF THE MILLIONS OF PEOPLE USING pcANYWHERE.



What good is working away from the office if you can't access your PC? Unfortunately, most remote computing software has become so complex, you may waste more time setting up your call than getting work done. Luckily, now there's Norton pcANYWHERE™ 2.0 for Windows.

NEW VERSION 2.0

THE BEST GETS BETTER.

Norton pcANYWHERE is the most advanced implementation of remote computing technology available, made easy. But don't take our word for it. Millions of people have already expanded their growing work environment with Norton pcANYWHERE.

PC MAGAZINE EDITORS' CHOICE August 1994 pcANYWHERE 1.0

And why wouldn't they? Norton pcANYWHERE doesn't require TSRs, freeing up memory for other applications you may need. Moreover, pcANYWHERE doesn't replace any system .INI drivers, so you don't have to change your Windows environment to use it. pcANYWHERE is actually the only remote access software available today that offers this unique feature set combination.

Of course, to make sure you're always working with the most recent version of your file, our new file manager saves you time by allowing you to synchronize your files and directories on remote and office PCs.

LEAVE YOUR HASSLES AT THE OFFICE.

But the real beauty of Norton pcANYWHERE is it's easy to use. And to make it even easier, we've included Smart Set-Up™ and Norton Assistant to help you get up and running right out of the box. And a graphical user interface with long file name support already built in to help you in the transition to Windows 95. So stop by your local software store today. After all, millions of people can't be wrong.

The Peter Norton Group has made remote computing easier for everyone with Norton pcANYWHERE.

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For a limited time get a special $30 rebate when you purchase Norton pcANYWHERE for Windows or DOS. That's almost 30% off the estimated street price.

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DIAMOND Stealth 64 VRAM - $399**	77.1†
ATI Graphics Xpression - $249**	75.1†

†Overall performance scores (measured in WTIS) as published in the February issue of PC World.
***Performance scores for VELOCITY 64V obtained by STB using a comparably equipped system and test.*

STB: We've Taken The Lead.

STB is the world's largest manufacturer of DRAM video accelerators. So it should come as no surprise that we make the fastest video boards on the planet. But here's the surprising part: our POWERGRAPH 64 DRAM card actually outperforms their VRAM†. Of course, STB boards offer full virtual screen capabilities. Astronomical refresh rates (some as high as 100 Hz). Unbelievable resolutions, up to 1600 x 1200. Up to 16.7 million colors. Our VELOCITY 64V adds full-motion video playback. Your choice of PCI or VL bus. And all at prices that are very refreshing indeed. Enough already. Go buy one. And see for yourself.

#1 February 1995

**Get the POWERGRAPH 64 with 2MB DRAM for just $199, or the VELOCITY 64V with 2MB VRAM for just $299.*

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Circle 210 on reader service card

RELIABILITY AND SERVICE MONITOR

Win a Micro Express MicroFlex-VL/80

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Micro Express MicroFlex-VL/80, a Best Buy Am486DX2-80 PC.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 5-SS, *PC World*, 501 Second St. #600, San Francisco, CA 94107-1496. Surveys must be received by May 31.

PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact prize winners at the telephone and fax numbers they provide. If *PC World* is unable to do so within 30 days of the drawing, a substitute winner will be selected. No purchase necessary. Void where prohibited by law.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?

○ By subscription ○ On the newsstand ○ From someone else

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer	○ Compudyne	○ Future Tech	○ Mitac	○ Tangent
○ Acma	○ Comtrade	○ Gateway 2000	○ NEC	○ Texas Instruments
○ ALR	○ Cornell	○ Hewlett-Packard	○ Netis	○ Toshiba
○ Apple	○ CTX	○ Hyundai	○ Packard Bell	○ Tri-Star
○ AST	○ Dell	○ IBM	○ Panasonic	○ Twinhead
○ AT&T (NCR)	○ Diamond	○ Insight	○ Pionex	○ USA Flex
○ Austin	○ Digital (DEC)	○ Intelesys	○ Polywell	○ VTech (Expotech, Laser)
○ Axik	○ DTK	○ Leading Edge	○ Quantex	○ Winbook
○ Blackship	○ Eltech	○ Micro Express	○ Samsung	○ Zenith (ZDS)
○ Canon	○ EPS	○ Micron	○ Sharp	○ Zenon
○ Compaq	○ Epson	○ Midwest Micro	○ Swan	○ Zeos
○ CompuAdd	○ Everex	○ MIS	○ Tandy	○ Other

What size is this PC?

○ Desktop
○ Notebook/laptop
○ Hand-held

What is the CPU?

○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?

○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ Value-added reseller
○ Other

After ordering, how long did it take to get your PC?

○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ More than 4 weeks

Who set up your PC?

○ Dealer/retailer/VAR
○ Staff computer technician
○ Self or coworker

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 90	○ 92	○ 94
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 91	○ 93	○ 95

When you first set up your PC, were any components "dead on arrival" (DOA)?

○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

Did your problem occur only after you added your own hardware or software?

○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?

○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?

○ No problem ever ○ Three
○ One ○ Four
○ Two ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan	○ Mar	○ May	○ July	○ Sept	○ Nov	○ 90	○ 92	○ 94
○ Feb	○ Apr	○ June	○ Aug	○ Oct	○ Dec	○ 91	○ 93	○ 95

How long was this after you purchased your PC?

○ Less than 1 month ○ 4–6 months ○ More than 12 months
○ 1–3 months ○ 7–12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?

○ Yes ○ No ○ Don't know

Did the problem occur under warranty?

○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)

○ Faulty component ○ Wrong configuration ○ Device conflicts ○ Other
○ Incorrectly installed software ○ Faulty peripheral ○ OS problem ○ Don't know

If a component failed, which one was it? (Mark all that apply.)

○ Battery	○ Graphics/video board	○ Modem/fax board	○ Power supply
○ CD-ROM	○ Hard drive	○ Monitor/screen	○ Sound board
○ CPU	○ Keyboard	○ Motherboard	○ Other
○ Floppy drive	○ Memory	○ Mouse	

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?

○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)

○ Phone ○ System swap
○ On site ○ Component swap
○ In store ○ Factory return

If you received phone service, how long were you on hold?

○ Not at all ○ 1–2 minutes ○ 6–10 minutes ○ More than 20 minutes
○ Less than 1 minute ○ 3–5 minutes ○ 11–20 minutes

How long did it take before you talked to the person who finally helped you?

○ Less than 15 minutes ○ 2–5 hours ○ 11–24 hours ○ 3–5 days
○ 15 minutes–1 hour ○ 6–10 hours ○ 1½–2 days ○ 1 week or more

How long did it take to resolve the problem completely?

○ 1–2 days ○ More than 1 month
○ 3–7 days ○ Never resolved
○ 1½–4 weeks ○ Awaiting resolution

Was the problem resolved to your satisfaction?

○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?

○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?

○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

PLEASE FAX TO 415/974-7367

WHAT HAPPENS WHEN YOU ADD SIZE TO AN ALREADY EXTRAORDINARY PACKAGE?

MXP17F

PC WORLD BEST BUY

April 1995

WHAT DO YOU THINK?

At 7 feet 2 inches tall, Kareem Abdul-Jabbar has got some serious size. But that's only half the story. The fact that he added superior basketball skills to an already imposing frame is what made him a dominant force in the NBA for two solid decades.

The new ergonomically and aesthetically designed Elite series of monitors from MAG InnoVision have features that other monitors just can't touch. And the fact that they only come in the larger 15-inch, 17-inch and 21-inch sizes with the most advanced CRT technologies makes them truly fantastic. Advance Display Calibration, Green Energy and LCD displays combined with ultra high resolutions up to 1600 x 1280, lightening-quick refresh rates and crystal clear dot pitches make them impossible to beat. And since they're so reliable, we'll even throw in a 3-year limited warranty.

So pick one up at a MAG InnoVision dealer near you. Their larger size and imposing features are liable to dominate the market for years to come and they cost a lot less than, say, an NBA draft pick these days.

MAG INNOVISION

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Circle 151 on reader service card

Top 10 Windows Accelerators: Stealth Sneaks Up on STB

You may crave performance, but with today's fast accelerators it's features and price that make the difference. Almost all new boards are Energy Star–compliant, shutting down the monitor during inactivity. And many vendors have added tools to manage resolutions and color settings, as well as features like a virtual desktop for scrolling to open programs outside the display area. Thus the Paradise Bahamas 64, which now comes with Western Digital's Oasis graphics utilities, advances to third place on our Top 10. ATI's ninth-place WinTurbo has always boasted excellent graphics utilities, but edged onto our list only after a $30 price cut.

The Diamond Stealth 64 DRAM racked up an astounding 80.1 WITS score.

This month we tested the updated Diamond Stealth 64 DRAM, a 2MB board using the same S3 Trio64 chip found on the top-ranked STB Powergraph 64. The PCI version of the Diamond Stealth racked up an astounding 80.1 score in *PC World*'s Windows Integrated Test Suite (WITS) and rocketed to number two on our list with the help of a strong set of features. Among all the graphics boards we've tested, the $219 Stealth 64 DRAM is second only to the $850 Number Nine Imagine 128 in performance. The VL version's 76.2 score is competitive with those of the fastest VL bus cards. Also, Diamond has enhanced its InControl Tools software, while maintaining strong documentation and service policies.

Two other boards we tested this month use the same S3 Vision864 chip and 2MB of DRAM found on other Top 10 contenders. The VL version of the Orchid Fahrenheit 64 climbed to seventh place on our list with an impressive WITS score of 77. Orchid's useful Windows software and a strong four-year warranty offset the board's relatively high $219 street price. And LAN administrators will appreciate the optional network installation. The $199 WG-3000P2 from DFI looks like a real bargain, especially with a fast 77.5 WITS score. But the card lacks graphics controls, gives you no help on installation, has a short one-year warranty, and lacks online service. For these reasons, DFI's board doesn't make it into our Top 10.

WITS was developed by Jon Peddie Associates, a PC graphics consulting firm. Jon Peddie and Fred Dunn are the firm's principal officers.

TOP 10 ACCELERATORS

New this month
Up from last month
No change from last month
Down from last month

		Overall value	Estimated street price	Windows Integrated Test Suite scores: Word 2.0 for Windows	Excel 4.0	CorelDraw 3.0	PhotoStyler 1.1	QuarkXPress 3.11	Freelance Graphics 2.01	Overall WITS score	RAM (MB/type)[1] Bus type	Chip Driver date	Reader service number
1	STB Powergraph 64 800/234-4334	99	$180	13.6	16.5	13.7	11.7	16.7	6.1	78.2	2 / D PCI	Trio64 7/11/94	601
2	Diamond Stealth 64 DRAM [2] 800/468-5846	96	$219	14.2	17.1	14.3	11.7	16.8	6.1	80.1	2 / D PCI	Trio64 10/29/94	602
3	Paradise Bahamas 64 800/568-9272	96	$179	13.7	16.4	13.3	11.3	16.6	6.3	77.4	2 / D PCI	Vision864 7/11/94	603
4	ATI Graphics Xpression 905/882-2600	95	$215	13.4	16.6	13.2	11.6	15.6	4.8	75.1	2 / D PCI	88800CX 4/11/94	604
5	STB Powergraph Pro 800/234-4334	93	$219	12.8	15.6	12.2	11.7	14.6	6.6	73.4	2 / D PCI	Vision864 5/9/94	605
6	STB LightSpeed 800/234-4334	93	$179	12.5	14.5	12.6	11.4	14.7	5.9	71.5	2 / D VL	ET4000/W32p 4/10/94	606
7	Orchid Fahrenheit 64 800/767-2443	93	$219	13.1	15.9	13.6	11.5	16.5	6.4	77.0	2 / D VL	Vision864 12/14/94	607
8	Hercules Stingray 64 800/532-0600	92	$179	13.8	16.0	13.7	11.8	16.0	3.8	75.0	2 / D PCI	Ark2000PV 10/27/94	608
9	ATI WinTurbo 905/882-2600	91	$289	13.5	17.3	12.2	11.4	17.2	6.1	77.6	2 / V VL	88800GX 7/7/94	609
10	Hercules Dynamite Power PCI 800/532-0600	91	$199	13.2	15.2	13.3	12.8	15.3	5.7	75.5	2 / D PCI	ET4000/W32p 5/11/94	610

Methodology Boards were tested at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall value score balances performance, estimated street price, and features. The overall WITS score is the aggregate of the application scores. For all scores, higher is better.

[1] D = DRAM, V = VRAM.
[2] Comparable value offered by other bus versions tested.
For more information about all products in this table, circle reader service no. 901.

HP quality in value-priced PCs.

HP Vectra VL2

from
$1,079†

- *Intel 50-MHz 486SX2, 50- and 66-MHz 486DX2, 100-MHz DX4, upgradeable to Pentium™ Overdrive™ processor; Intel 60-MHz Pentium processor*
- *Chip upgrades to higher performance*
- *On-board accelerated local-bus video*
- *210-MB hard drive[1]*
- *4-MB RAM, expandable to 64-MB*
- *512 KB or 1 MB of Video RAM standard*
- *ISA Plug-n-Play compliant*
- *Desktop Power Management*
- *EPA Energy Star certified*
- *Local bus Fast-IDE hard disk interface***
- *1280 x 1024 video resolution***
- *Optional 128- or 256-KB cache memory***
- *Free three-year limited warranty for parts and labor[2]*

High-performance network-ready PCs in a slimline package.

HP Vectra N2

from
$1,419†

- *Intel 50-MHz 486SX2, 50- and 66-MHz 486DX2, upgradable to Pentium Overdrive processor*
- *Optional 128- or 256-KB second level cache*
- *270-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*
- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*
- *1 MB of video RAM standard, expandable to 2 MB*
- *Slimline package with two mass storage shelves and three ISA slots*
- *Optional integrated 10Base-T networking*
- *Multilevel security*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

High-performance PCs for the connected office.

HP Vectra M2

from
$1,469†

- *Intel 50-MHz 486SX2; 50- and 66-MHz 486DX2, 100-MHz DX4, upgradable to Pentium Overdrive processor*
- *Optional 128- or 256-KB second level cache*
- *Four mass storage shelves; four expansion slots*
- *One available 32-bit VL-bus slot*
- *270-MB, 14-ms Fast-IDE hard drive[1]*
- *32-bit Fast-IDE local-bus hard disk interface*
- *8-MB RAM, expandable to 96-MB*
- *Ultra VGA2 local-bus accelerated video supporting up to 1280 x 1024 resolution*
- *Optional integrated 10Base-T networking*
- *Systems Diagnostics Utility*
- *EPA Energy Star certified*
- *ISA Autoconfiguration utility (Plug-n-Play)*
- *Integrated Desktop Management Interface (DMI)[3]*
- *Free three-year limited warranty for parts and labor[2]*

Exceptional 486 performance advanced business use.

HP Vectra XM2

from
$1,779†

- *Intel 50- and 66-MHz 486D 100-MHz DX4, upgradable Pentium Overdrive*
- *PCI architecture*
- *Standard 256-KB second le write-back cache*
- *Four mass storage shelves; expansion slots*
- *Two available 32-bit PCI expansion slots*
- *210-MB, 14-ms Fast-IDE h drive[1]*
- *32-bit PCI IDE hard disk interface*
- *8-MB RAM, expandable to 96-MB*
- *PCI Integrated 64-bit S3 Vision-864 graphics accele supporting up to 1280 x 10 resolution*
- *Optional PCI Integrated 32-bit 10Base-T networkin*
- *Integrated Desktop Manag ment Interface (DMI)[3]*
- *EPA Energy Star certified*
- *Free three-year limited warranty for parts and lab*

intel inside

*Source: 1994 J.D. Power and Associates Desktop PC Customer Satisfaction Study.℠ Study conducted among business users and based on 1,528 user respondents
**Feature included with some models. All HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 pre-installed; HP mouse and keyboard incl
†U.S. list price, dealer prices may vary. Monitor not included. [1]Other capacities available. [2]First year on-site, 24-hour service. Second and third year return to deale
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Corporation. ©1994 Hewlett-Packard Company PPG412

ultimate PC for advanced business and technical applications.

HP Vectra XU

from
$3,139†

l 90-MHz Pentium essor

nd processor socket for MP 1.1 multi-processing

ndard 256-KB second level nchronous or burst nchronous write-back cache

architecture

r mass storage shelves ee front accessible); five nsion slots

available 32-bit PCI nsion slots

-MB, 12-ms Fast SCSI-2 l drive[1]

grated 32-bit PCI SCSI-2 rface

integrated 64-bit S3 on-864 graphics with 1280 024 resolution or PCI MGA ma Plus graphics with up 600 x 1200 resolution

bit PCI IDE hard disk rface

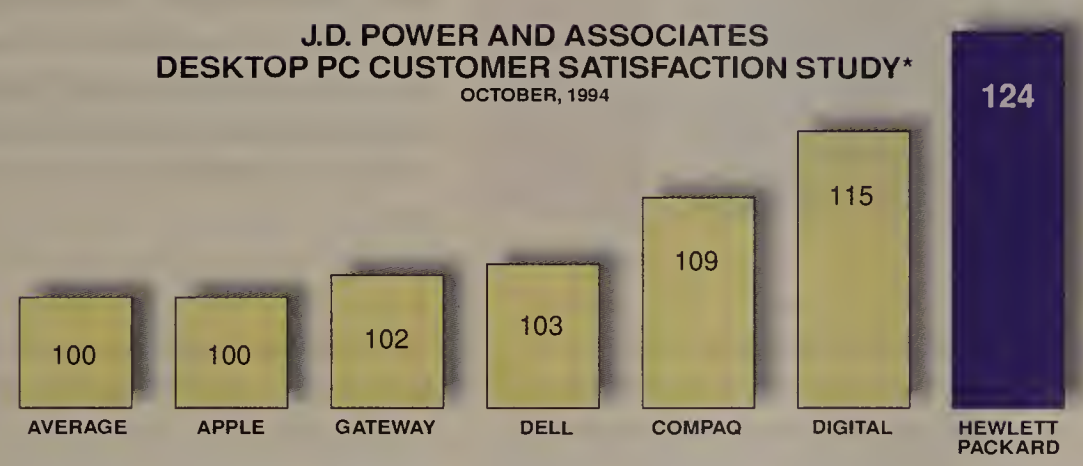
16 MB of RAM, expandable 56 MB

Integrated 32-bit 10Base-T vorking

grated Desktop Manage- nt Interface (DMI)[3]

e three-year limited ranty for parts and labor[2]

No other PC can display this icon.



J.D. Power and Associates ranks HP highest in customer satisfaction among desktop personal computer business users.

Not to be boastful, but people are taking a lot more notice of HP PCs lately. After all, they're the only computers that carry the symbol of one of the most prestigious awards in the business. Fact is, in overall scoring HP outpaced every other vendor in the field.

Of course, HP PCs also lead the pack in value, with all the features you need, at prices you can afford.

For a copy of *The Power Report*℠ on the Desktop PC Study, or the name of the dealer nearest you, call us at 1-800-322-HPPC, Ext. 8998 today. And join the ranks of the most satisfied PC customers in America.

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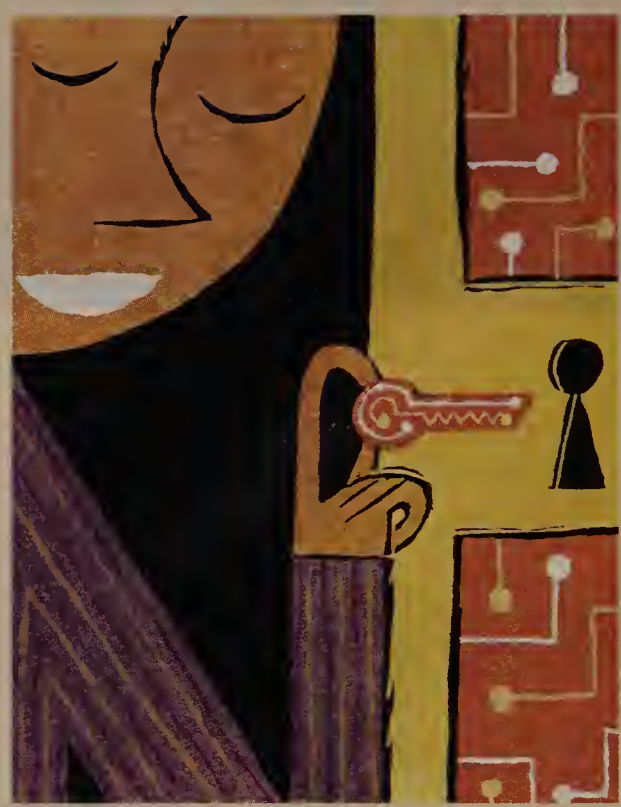
HELP LINE Q&A



Tip of the Month

GET ALL THE HARD DRIVE SPACE THAT'S COMING TO YOU: Be sure you can use all of your new IDE hard drive's capacity. The drive you bought may be labeled Enhanced IDE, but the DOS-to-BIOS interface on systems without Enhanced-IDE BIOSs cannot handle more than 1024 cylinders or more than 63 sectors. On top of that, the BIOS-to-IDE interface cannot handle more than 16 heads. Put those limits all together, and you can access only 504MB (528,482,304 bytes) of disk space, which may force you to leave a substantial chunk of your new drive unused.

Fortunately, if you have a system without an Enhanced-IDE BIOS, several utilities can help you get around this problem—for example, Vfeature Deluxe from Golden Bow Systems (800/284-3269), DrivePro and EZ-Drive from Micro House International (800/926-8299), Disk Manager from Ontrack Computer Systems (800/752-1333), and SpeedStor from Storage Dimensions (800/765-7895). All five let you make partitions of at least 1GB. And if you've recently bought a machine with an advertised hard drive capacity close to 500MB, one of these utilities may make previously inaccessible hard disk space usable.

Brett Glass, Contributing Editor

Digital Phone Dilemma

Q What happens if you plug a regular modem—one meant for a regular, analog telephone line—into a digital PBX telephone line? Is it possible for the PBX line to damage the modem?
Gerald Webb, Charlotte, North Carolina

A In most cases, nothing at all will happen; the modem won't be damaged, but it won't work, either. However, I have heard of some PBXs that send out high-voltage pulses damaging to some modems—for example, the new, tiny PC Card (originally known as PCMCIA) modem cards. The best way to prevent such a telephone system from frying your modem is decidedly low-tech: Take along a cheap $5 analog telephone (available at any discount store or drugstore) and plug it in first. If you can't get a dial tone, don't bother plugging in the modem; there's no way it will work. IBM also makes a barrel-shaped "modem protector" you can insert between the modem and phone line to protect your system against surges, but it costs considerably more than a cheap telephone and is not as useful.

Prompter Printer

Q My PC is attached to a laser printer with 6MB of internal RAM and a special I/O board that has an additional 4MB of RAM. I print to the laser through COM2 at the maximum setting of 19.2 kbps. Yet a print job that Windows Print Manager says is 1.5MB in size takes forever to send to the printer. How can I speed things up when printing large documents?
David Rogers, Southampton, Pennsylvania

A In the past, we published tips in *PC World* describing the right way to set up a serial printer. But now that the world has entered the age of graphical user interfaces (like Windows and OS/2), it's no longer practical to use a serial port to connect a printer to a PC. Unless you're using DOS and printing only text, a one-page letter takes quite a while to print (and a drawing takes an eternity) without a faster interface between your PC and your printer.

Here are the options in order of increasing cost. The least expensive interface you can switch to is a parallel port, which comes built into both your PC and, unless it's really old, your printer. All you'll need is a parallel printer cable, available for $5 to $7 at any computer store. Faster still are the two enhanced types of parallel ports, EPP and ECP; however, these will probably require you to buy a new parallel port card for your PC. You can also go to ethernet, but you'll need an ethernet card for your PC, an ethernet interface for your printer, and LAN software to drive everything. Finally, some companies (such as LaserMaster) sell boards that fit inside your PC and drive the printer's internal engine directly at video speeds.

Before you spend money on any of the latter solutions, however, I recommend that you try the parallel port—perhaps in conjunction with a hardware

ADAM McCAULEY

or software print spooler. (I don't recommend Windows' Print Manager—it's not at all fast and has compatibility problems with some applications.) The difference may amaze you.

Directories Drag Down Defrag

Q I have a problem with DOS's Defrag utility: It returns an 'Insufficient memory' error when I try to run it on systems with lots of directories. Some of these PCs have 16MB of memory. Is there any way to get around this problem?
Greg Forseth, Shorewood, Illinois

A DOS's Defrag utility is a stripped-down, older version of Norton's SpeedDisk, which at one time had the same memory problems (Defrag is complaining about the amount of free conventional memory; you'd have the same problem whether your PCs had 2MB or 20MB of memory). My secret work-around: Increase your system's conventional memory by using a memory manager to configure your PC to load DOS high and to load as few TSRs and drivers as possible (loading them high, as well); then use a program such as VIDRAM from Quarterdeck's QEMM, or Stretch from Helix Software's NetRoom, to free up even more conventional memory. (You can typically get 720K or more on a VGA system.) With this much DOS RAM, Defrag can handle nearly any drive. If it doesn't, invest in the latest version of The Norton Utilities and run SpeedDisk with the /BIGDIR option, which was designed to handle this situation.

Memory Muddle

Q I run Windows for Workgroups 3.11 on my PC. I recently upgraded from 16MB of RAM to 32MB to get more room for computer-aided design, graphics, and so on. I use a small program that stays on screen and tells me the amount of free memory. When I had 16MB of RAM, it told me memory was 74 percent free at Windows start-up, and the number dropped as I opened programs. Although I now have 32MB installed, free memory still starts out at 74 percent and drops at the same rate! It's as if I never added any memory at all. Even without checking, I can tell that free memory is being consumed, because my system bogs down more and more as it runs.

I've tried everything I can think of, including the optimizer that came with my memory manager, and cannot seem to get the system to show more free resources with the additional memory installed. Why?
Sean Duncan, Corvallis, Oregon

A Because so many Windows programs (including Microsoft's own products) fail to free up the resource memory they've been using (which they should do when you exit them), running out of memory is almost a certainty unless you run very few programs and restart Windows frequently. But resource memory (which both your small program and Program Manager's Help•About dialog box include in the percentage free) and system memory (your 32MB of RAM) are not the same. They're often confused because Windows displays an 'Out of memory' error message whenever either type isn't available. (Windows also displays that error message for a variety of other problems—for example, a shortage of free disk space.)

Windows resources are confined within three 64K blocks (called *heaps*). Adding more RAM may prevent your system from *thrashing* (swapping data to and from disk because there's too little system memory to fit all the applications you've opened), but it won't increase the number or size of the heaps Windows uses to hold its resources. Windows uses resource memory to store certain system data. For instance, every application and document window you open uses a bit of resource

USER GROUP OF THE MONTH

Long Island PC Users Group

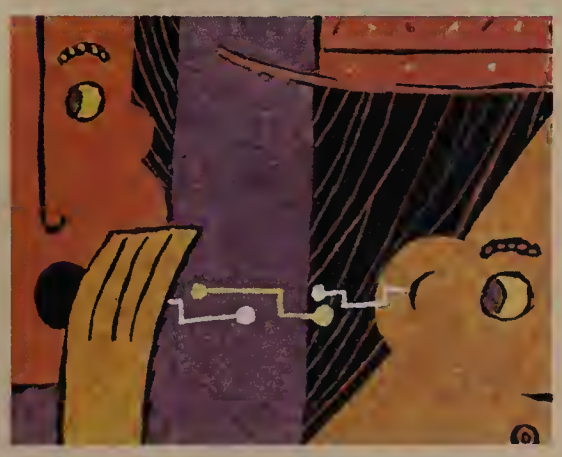
May's user group tips come from the Long Island PC Users Group (LIPCUG). The group meets on the second Friday of each month at the *Newsday* headquarters on Pinelawn Road in Melville, close to Route 110. The beginners' session starts at 7 p.m., and the general meeting follows at 8. LIPCUG offers special interest groups (SIGs), including ones that cover Windows, WordPerfect, Quicken, the Internet and communications, databases, and beginners' issues. LIPCUG's bulletin board service (BBS) contains more than 1GB of shareware and public domain programs. The group's monthly newsletter, *PC Lifeline,* features new product reviews, commentary, tips, and a calendar of events.

For more information, contact Roy Linker, president, at 659 Strafford Rd., Baldwin, NY 11510-1031, or call the group's hot line at 516/546-7857. The BBS number is 516/546-8025. Membership costs $24 a year and includes the newsletter, the SIGs, and a discount for local Internet access.

Reader service no. 740

UNINTERRUPTIBLE BATCH FILES: Create a batch file that won't display on screen or accept interruption from the keyboard (except <Ctrl>-<Alt>-<Del>). Make ctty nul the first line of the file and ctty con the last line. Put these commands around a portion of batch file code to block its input and output.

Alan Linker
Long Island PC Users Group



memory. When any one of these tiny areas of memory fills up (each is used for a different purpose), Windows has no way of making it bigger or cleaning it out; the results are slowdowns, erratic operation, and system crashes. Your monitor program still shows free memory as 74 percent or less because it's telling you the extent to which those critical heaps have been filled, not how much of your 16MB or 32MB of RAM is being used.

If you have had recurring problems with depleted Windows system resources (as I have), your best move may be to try out IBM's OS/2. While Windows shares those limited 64K blocks of system resources among all the applications you're running, Warp can give each Windows application its own private set of system resources—as if it were running alone on the computer. And when the program is finished running, all the memory it used is freed and can be used by other programs. Thus, you'll probably have far fewer memory problems—as well as far fewer crashes.

Multiple Media

Q I have been trying to copy a rather large binary file to floppy disks so I can transfer it to another computer. The problem is that the file is larger than the capacity of the floppy disk. I have tried compressing the file, but it is still too large. I believe your magazine once published a small COM program that would split a binary file into as many parts as necessary to fit it on floppy disks. Where can I find that program or some other utility that will do the same thing?
Jared Malave, Ithaca, New York

A We did once write about a program that split files, but it's not the best solution anymore. Nowadays, the right way to copy a large file to multiple floppies is to use the disk-spanning features of the ubiquitous PKZip compression program from PKWare. Besides compressing the file to save space, PKZip 2.x, when used with the -& command line option, stores the entire file on as many floppy disks as necessary. If you add the letter *u* after the ampersand, PKZip unconditionally formats each disk before writing to it, guaranteeing that you'll start with clean, formatted media. PKUnzip, the corresponding decompression program, is designed to recognize archives that span multiple disks and restore them correctly. To find out more about PKZip's command line options, consult the manual; you can also type PKZip (with no parameters) at the DOS prompt for a terse summary. PKZip is shareware, and the latest version, 2.04g, can be found on PC World Online (as **pkz2.04g.exe**) and most BBSs. Readers without modems can get a licensed copy directly from PKWare.

- **PKZip** $47, plus $5 for shipping and handling; PKWare; 414/354-8699
  Reader service no. 739

Soldered CMOS

Q My 386SX-33–based clone's CMOS battery (a little barrel-shaped affair) is beginning to fade; I have to enter the date and time manually every time I boot up. Unfortunately, the battery is soldered to the motherboard. I don't relish the prospect of taking the machine to a repair shop and paying for the labor to have a new battery soldered in. Is there any way to replace the battery without going through that expensive and time-consuming process? Does anybody make a kit that would allow the substitution of an easier-to-replace type of battery?
John Martin, America Online

A It'd be nice if motherboard manufacturers did not assume their products would be obsolete by the time the lithium batteries died. Luckily, most motherboards—even those with soldered-in batteries—have a standard AT battery connector consisting of three pins that stick up from the motherboard. (The pins are arranged as if four pins were originally evenly spaced in a row and an inner pin was subsequently removed.) If your board has this connector (it should be somewhere near the existing battery), connect a replacement CMOS battery to it and then cut out the old battery with a pair of diagonal cutters. If there's no such connector, check to see if there's a socket for one or two coin-shaped replacement lithium batteries. If there is, you can cut out the old one and add replacements to that socket.

You will need to do a bit of surgery if this plan fails. Cut out the old battery with scissors or pliers, leaving as much as possible of the original battery's lead wires intact. Then obtain a replacement battery (any 3- to 4.5-volt computer battery will do), and solder the wires of the replacement battery to those wires. (Polarity is important; make sure the positive lead of the new battery, which will be red or marked with a plus sign, goes where the positive terminal of the old one used to be.) When you're done, the PC should keep time for years with no further effort on your part.

How Do You Run Run Times?

Q Where do you put vbrun100, vbrun200, or vbrun300 after you download it from an online service? What Windows file does it go in, and how do you load it into that file?
Edwin H. White, America Online

A The files vbrun100.dll, vbrun200.dll, and vbrun300.dll are the runtime libraries for Microsoft Visual Basic 1.0, 2.0, and 3.0, respectively, and must be on your hard disk if you want to run programs developed with Visual Basic. You don't "load" the files to get them to work; these programs access them as needed. Just copy the run times into your windows/system directory. I keep all three there so I can run programs that were created with any version of Visual Basic.

By Brett Glass

Brett Glass is a PC World *contributing editor.* Help Line *welcomes your questions and pays $50 for published items.* *See page 12 for contact information.*

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SPREADSHEETS Q&A

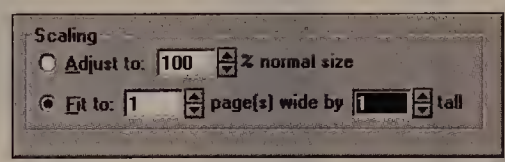
Shrinking Reports in Any Spreadsheet

Q I manage financial data using 1-2-3 release 3.1. I want to move up to a Windows spreadsheet, but I require specific printing capabilities. My worksheets fill many rows, and I need the program to condense the reports horizontally so that they fit within one page. Also, if I print several such reports based on different ranges, the program must print each one the same size. Which of the Windows spreadsheets would best fit my requirements?
Charles Canfield, Dallas

A You'll be in good shape with either Excel 5.0 or 1-2-3 release 5.0, but less happy about Quattro Pro 6.0. In all three programs, you start by selecting the widest range and selecting *File•Page Setup*.

In Excel, you click *Fit to* in the Scaling box, and then delete the 1 in the 'tall' field.

Click *Print Preview* to check your report on the screen. If it looks okay, click *Setup* to return to the Page Setup dialog box, and make a note of the percentage that appears in the 'Adjust to' field. When you set up subsequent reports, don't bother with the 'Fit to' step; just enter the same percentage, and print away.



In 1-2-3's Page Setup dialog box, select *Fit columns to page* in the Size drop-down list, and click *OK*. Then preview the page using *File•Print Preview*, return to the Page Setup dialog box by clicking the *Print Preview Close* button, select *Manually scale* in the Size drop-down list, and note the percentage that appears. For subsequent printouts, just choose *Manually scale* and enter the percentage.

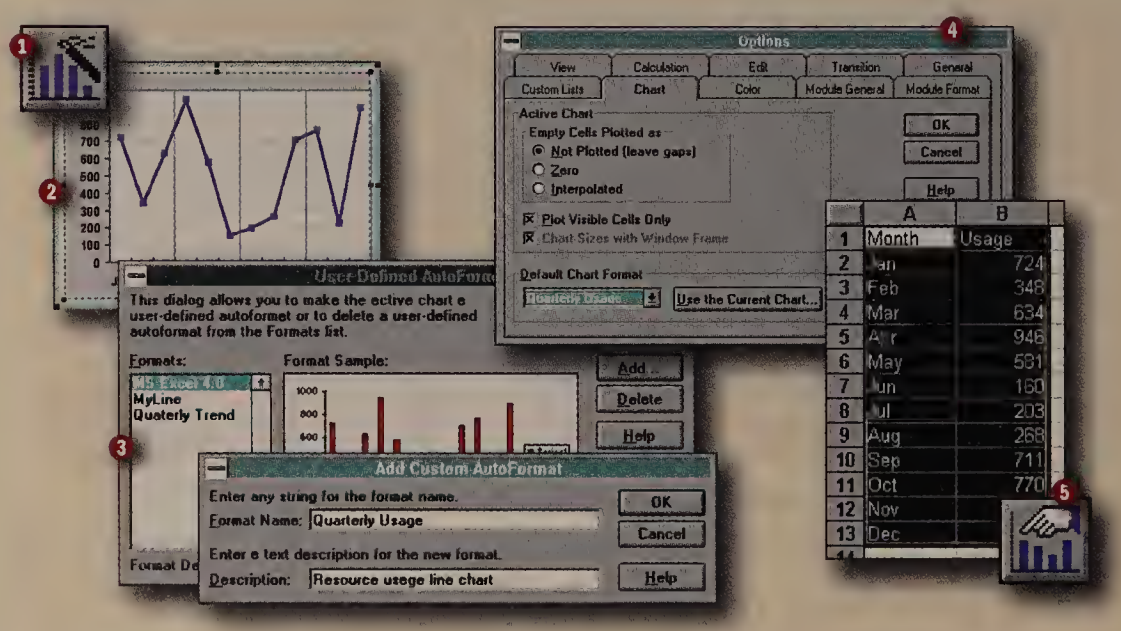
Unfortunately, Quattro Pro 6.0 offers only single-page compression and manual scaling. For a one-page report, select *Print Scaling* in the Spreadsheet Page Setup dialog box and check the *Print to fit* box that subsequently appears. For multipage reports you're on your own: The only way to determine the correct compression factor is by trial and error.

Custom Chart Formats in Excel 5.0

Q When I first purchased Excel I was thrilled with the Chart Wizard, which took me by the hand and led me through the graphing procedure. But now the thrill is gone. I have three basic types of charts that I use over and over, and slogging through the Chart Wizard (followed by extensive tweaking) is a slow way to build them. I used View•Toolbars•Chart to locate the Default Chart tool, but it just gives me a lame-looking bar chart that's far from what I need. How can I build my charts faster?
Quentin LaForge, Baton Rouge, Louisiana

A Begin by setting up custom formats for each of your basic chart types; the first three steps in **FIGURE 1** show you how. Decide which chart you create most often, then follow steps 4 and 5 to assign it to the Default Chart tool. Whenever you need that format, simply select your data, click the *Default Chart* tool, and click the worksheet. Your graph will appear with your custom format.

Accessing the other two formats requires an extra step. After creating a new chart, double-click the chart object to edit it, and select *Format•AutoFormat*. Click *User Defined* in the Formats Used box, then double-click the custom chart type you want.



❶ Use the Chart Wizard to create the graph. Then double-click the chart and edit as desired.

❷ With the chart selected, choose Format • AutoFormat. Click User-Defined, then Customize.

❸ Click Add. Enter a name and description for your new custom chart type.

❹ Select Tools • Options and click Chart. In the Default Chart Format list, select the name you've assigned to your custom chart format.

❺ To create a new custom chart, select its data, then click the Default Chart tool and click on the worksheet. The spot that you click will become the embedded chart's upper-left corner.

FIGURE 1: CREATE A CUSTOM CHART with just one mouse click. Simply set up the desired chart format, then assign it to Excel's Default Chart tool for easy access.

Locating a Value in an Excel Table

Q In Excel it's easy to identify the largest value in a range using the MAX() function. But I want to do

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```
'Find the largest value in a table
'
'Establish object variable to identify current region
Dim FindArea As Object
Sub FindBig()
    'Identify the range to search
    Set FindArea = Selection.CurrentRegion
    'Locate the largest value in that range
    FindArea.Find(What:=Application.Max(FindArea), _
    After:=ActiveCell).Activate
    End Sub
```

FIGURE 2: FIND THE CELL ADDRESS of the largest value in a range in Excel.

more than identify that number: I need to locate it quickly in a table containing thousands of numbers. I created an array formula that yields the cell address of the largest value in a range, but it doesn't work if the maximum value appears more than once. I'd prefer a solution that moves the active cell to the largest value wherever it occurs. Any ideas for doing this?

David Hager, Baton Rouge, Louisiana

A I came up with the macro shown in **FIGURE 2**. It finds a table's largest number (or one of them if it occurs more than once) with a single mouse click. The macro does this by searching the table in the vicinity of the active cell indicator and selecting the cell with the largest value after the active cell's location. To set up the macro, select *Insert•Macro•Module*, then type in the text shown in Figure 1. (Comments, which appear here in green, don't need to be entered; they simply explain each line.)

To execute the macro, click inside a table of numbers, choose *Tools•Macro*, and double-click *FindBig*. Or use the button tool to assign the macro to an on-screen button.

Selectively Erasing Cells in 1-2-3

Q I use 1-2-3 release 2.3 to track the Florida and Illinois state lotteries. I have two columns of numbers in my worksheet, and I've put the formula @IF(A1=B1,A1,"") in column C to compare the two. When the numbers in columns A and B are equal, this formula displays the number from column A; if they're not equal, it displays a blank cell. I then use /Range•Value to convert the formula in column C to values. That yields a column that shows the matching values interspersed with blank cells.

But, of course, the cells aren't really blank—they contain empty labels, which show up in the formula bar as a single apostrophe. How can I end up with a truly empty cell—not just one that *looks* blank?

William Grisko, Pensacola, Florida

A After you've copied your @if formula, try the following macro instead of using the /Range•Value command. Enter the statements shown in **FIGURE 3** into an available column, then use */Range•Name•Create* to assign the name **\D** to the macro's first cell. To execute the macro, select the cell at the top of the column you want to convert and press **<Alt>-D** (or **<Ctrl>-D** for Windows releases).

```
{if @cellpointer("type")="b"}{quit}
{if @isstring(@cellpointer("contents"))}
  {blank @cellpointer("address")}{d}{branch
  \D}
{edit}{calc}~{d}{branch \D}
```

The first statement stops the macro if the current cell is blank (after the macro has processed all the entries in the column, that is).

In the second line of the macro, the {if} statement acts only if the current cell contains a string (in your case, an empty label): It erases the cell, moves the cell pointer to the next row, and restarts the macro.

If the {if} statement doesn't find a label in the active cell, the third statement converts the formula in that cell to a number, moves the cell pointer to the next row, and restarts the macro.

Dashed Zeros in Quattro Pro

Q How can I make my Quattro Pro 5.0 worksheet display the zero values as two dashes?

Andrew Blake, Biloxi, Mississippi

A Select the relevant cells, right-click in the selection, select *Block•Properties*, click *Numeric Format*, then click *User Defined*. In the Formats Defined field, enter **N9,999.00;N'– –';N'('9,999.00')'** and click *OK*.

This format yields two decimals, negatives in parentheses, and zeros that show up as double dashes.

By Richard Scoville

Richard Scoville is a PC World *contributing editor and a software training consultant in Chapel Hill, North Carolina.* Spreadsheets *welcomes your questions and pays $50 for published items.* *See page 12 for contact information.*

```
{if @cellpointer("type")="b"}{quit}
{if @isstring(@cellpointer("contents"))}{blank @cellpointer("address")}{d}{branch\D}
{edit}{calc}~{d}{branch \D}
```

FIGURE 3: SELECTIVELY ERASE CELLS that contain empty labels (with hidden apostrophes) using this 1-2-3 macro.

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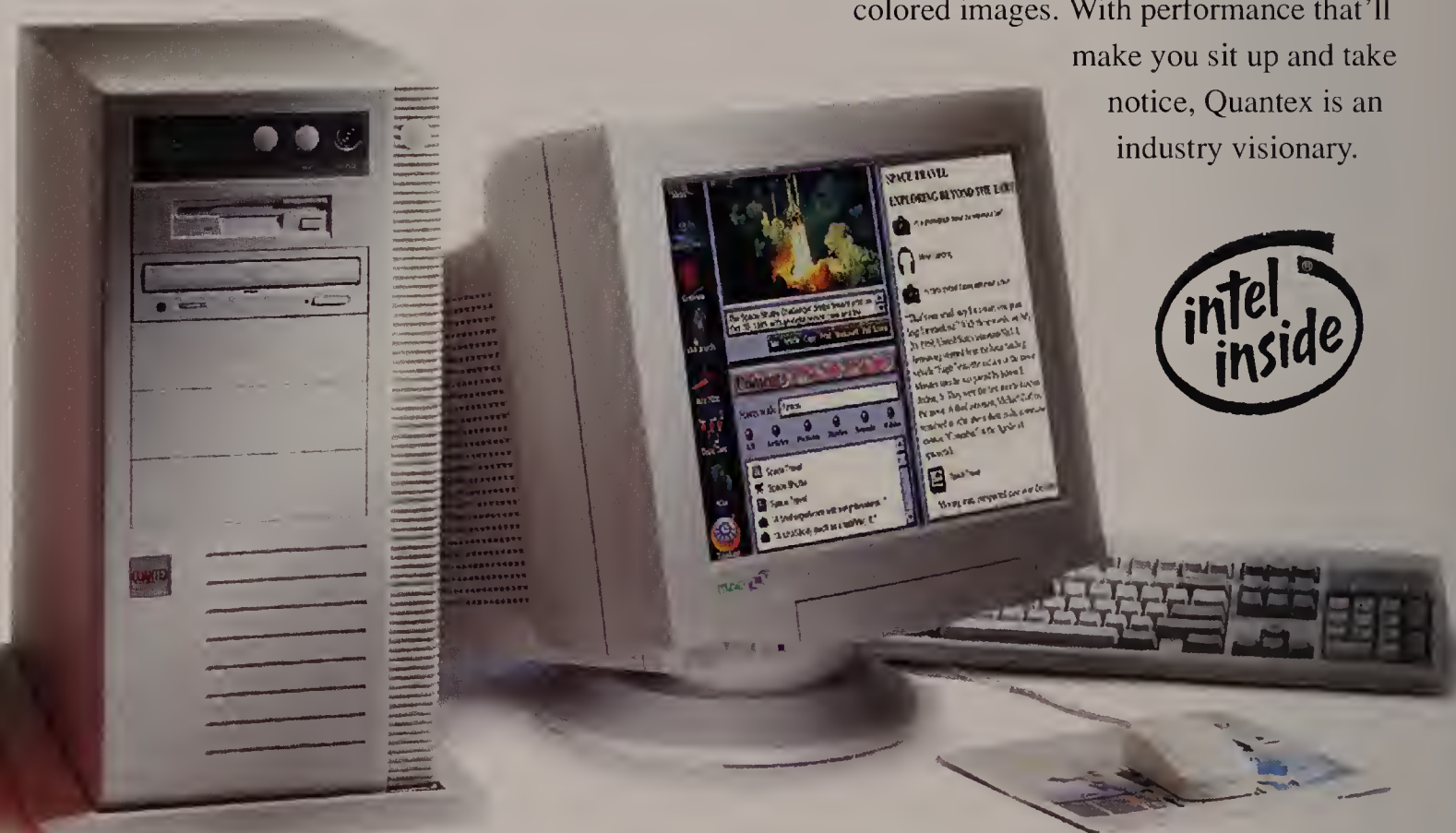

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WORD PROCESSING Q&A

Inserting Dates With WinWord 6.0

Q I've added a button to WinWord 6.0's tool bar that inserts the current date into a document with a mouse click. Unfortunately, the program inserts the date in numeric format (5/15/95) instead of in the format I prefer (May 15, 1995). Can I set up the button to insert the current date in the format I want?
Michael Gretkowski, PC World Online

A Sure; you can do it by recording a simple macro and attaching it to a new button. First, select *Tools•Macro* and enter a name—say, **InsertDate**—in the dialog box's Macro Name field. Type a description of the macro in the Description field, and click *Record*. When the Record Macro dialog box appears (see **FIGURE 1**), click the *Toolbars* icon, delete the old button you'd created to insert dates by dragging it off the tool bar, then drag the *InsertDate* macro name from the Customize dialog box onto your tool bar. The Custom Button dialog box will appear. Choose the button you'll use to launch the macro by double-clicking one of the icons or the *Text Button* icon in the dialog box. (Because text buttons display the name of the macro, I find them easier to use.) Click *Close* to finish creating the button and begin recording the macro.

The macro itself is quite simple. Just select *Insert•Date and Time*, and choose the format you want to use in the Date and Time dialog box. When you're done, click the stop button on the Macro Recorder pop-up. That's it. From now on, when you click your new tool bar button, the date will appear in your favorite format.

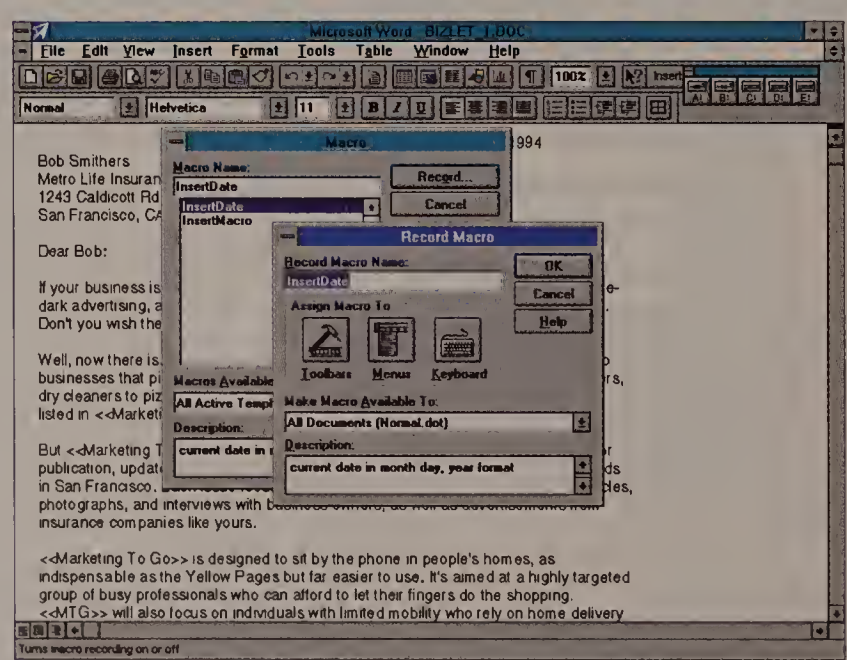

FIGURE 1: TO INSERT A CUSTOM DATE FORMAT in WinWord 6.0, you'll need to record a macro and add it to your tool bar.

Even Faster AutoText in WinWord 6.0

Q I find Word 6.0 for Windows' AutoText an amazingly handy feature for inserting boilerplate text in my documents. My problem is that the Insert AutoText button is too close to the AutoFormat and Insert Table buttons on the tool bar, and I often find myself clicking the wrong button. Is there a way to move this button? Better yet, can I use a keyboard shortcut to avoid the tool bar entirely?
Naomi Hogan, Tigard, Oregon

A The answer to both of your questions is yes. Let's start with moving your button. Select *Tools•Customize* and click the *Toolbars* tab in the Customize dialog box. Now, on the tool bar itself, click and drag the *AutoText* button to a new location (say, on the far right end of the tool bar), and select *Close*. That will get it away from the AutoFormat and Insert Table buttons and help you avoid confusion.

But a much better way to insert AutoText is to use WinWord's built-in keyboard shortcut. Simply type the name of your AutoText entry and press **<F3>**. The boilerplate text appears instantly in your document—much faster than mousing around with the tool bar.

Reading WordPerfect 6.0 Files in WinWord 6.0

Q I switched from WordPerfect 6.0 to WinWord 6.0 a short time ago and have never looked back. My problem now is that WinWord 6.0 does not recognize or convert my old WordPerfect 6.0 documents. I've already removed WordPerfect from my hard disk. How do I use these files with WinWord 6.0?
Denis Chidi Isizoh, Vatican City

A I wish I had a good answer for you, but the news is rather unpleasant. At press time Microsoft had no conversion filter available for WordPerfect 6.0 documents. However, the company says one might be available by mid-1995, or about the time you read this. Call Microsoft Word for Windows tech support at 206/462-9673 or log on to the CompuServe forum (**go msword**) or the Microsoft Download Service (206/936-6735) to check on filter availability. Microsoft will upload the new filter to these services when it is available.

In the meantime, your best solution is to reinstall WordPerfect 6.0 and save the documents in WordPerfect 5.1 or WinWord 2.0 format, which WinWord 6.0 can import. (A file translation utility such as Word for Word can convert WordPerfect 6.0 files to either format.)

- **Word for Word** $149; MasterSoft; 800/624-6107
  Reader service no. 787

After you've saved all the documents you're likely to need, you can once again delete WordPerfect.

Saving Text Files in WordPerfect 6.0

Q I'm a longtime user of WordPerfect and recently upgraded to version 6.0 for DOS. I like it pretty well, except for one thing—I can't figure out how to save files in ASCII format. In

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WordPerfect 5.1, I could press <Ctrl>-<F5> to access the Text In/Out menu. I can't find the equivalent function in 6.0. I looked in the Save As dialog box, but the only option offered is for WordPerfect 6.0 format. I'm a journalist, and my publication requires me to file stories electronically as ASCII text. What should I do?
Maggie D. Hall, Dunedin, Florida

A You're on the right track with the Save As dialog box; that's where WordPerfect's ASCII text option should be. If it isn't there, it's probably because you installed WordPerfect without installing the program's file conversion drivers. Fortunately, this problem is easily solved.

Dig out your original installation disks and insert the Install 1 disk into drive A. Type **A:\INSTALL** at the DOS prompt, select the *Custom/Minimum Installation* option, then select *Continue Installation* in the next screen, since you already have the program on your hard disk. Next, deselect all boxes except the *Conversion Drivers* box in the screen that follows, and press **<F10>** to continue the installation. Then insert disks and follow the screen prompts as instructed. The next time you run WordPerfect and issue the File•Save As command, you should find 'ASCII Text (Standard)' in the dialog box's Format list.

Type this	to produce this	Technique also works with
` a	à	e, i, o, u
' e	é	a, i, o, u, y
' c	ç	
" i	ï	a, e, o, u, y
^ o	ô	a, e, i, u
~ n	ñ	a, o

FIGURE 2: PARLEZ-VOUS WINDOWS? Windows' US-International keyboard layout lets you produce characters with accents or other diacritical marks using a few simple keystrokes.

WordPerfect 6.0 Goes International

Q I use WordPerfect 6.0a for Windows to create international correspondence, and I need to insert accented and other European language characters in my letters. Using WordPerfect's <Ctrl>-W command to pick characters from a dialog box is too time-consuming. Is there a simpler way to deal with my language problems?
Donald Jeffery, Hudson, Florida

A *Mais bien sûr!* You can easily teach WordPerfect—or virtually any other Windows word processor—to display characters using accents or other diacritical marks. The solution lies in tweaking Windows' International settings. Here's how to do it:

Run the Windows Control Panel and double-click the *International* icon (it looks like a globe). Click the *Keyboard Layout* drop-down list box, select *US-International*, then click *OK*. (If you don't have the appropriate driver installed, Windows will prompt you for the disk that contains it.) Then close the Control Panel.

Now you'll need to learn a few simple keyboard tricks to take advantage of this capability. When you use Windows' US-International keyboard layout, certain characters (like the quotation marks, the caret, and the tilde) act differently, depending on the character that follows it. For example, when you type a single quotation mark followed by the letter a, you get á (an a with an acute accent). If you type 'e, you get é. This works only for characters that accept diacritical marks; for instance, if you type 'z, that's what you'll see in your document.

FIGURE 2 illustrates how to produce diacritical marks for most European languages. However, this tip may not work with every Windows TrueType font—you may need to switch to Arial or another common typeface. Also, a few Scandinavian characters (like ø and å) aren't accessible by this method—you'll have to use WordPerfect's <Ctrl>-W Character command or Windows' Character Map to insert them.

USER GROUP TIP

WinWord Shortcuts

To preview the changes that WinWord's AutoFormat will make—without using the mouse—press <Ctrl>-K to run AutoFormat, then take a quick look and press <Ctrl>-Z to undo it just as quickly.

Stu Greenberg
Long Island PC Users Group

Ami Pro 3.01 Tables by the Numbers

Q I've run into a mysterious problem trying to format numbers inside Ami Pro 3.01 tables, and I'm hoping you have the answer. When I format a number in an Ami table as superscript for use as a footnote, the number reverts to normal format when I move to another cell in the table. I noticed a similar effect when I tried to format some numbers to print in red—they reverted to black when I moved to the next cell. What gives?
Albert Smith, Boston

A This mystery is actually not all that mysterious. The problem is that Ami Pro 3.01 doesn't allow some types of formatting—such as subscript, superscript, and the color red—to be applied to numbers when they appear in tables. (Version 3.1 fixes most, but not all, of these formatting problems.) In any case, the solution is rather easy. Just type a space before or after your number, then select both the space and the number when you apply formatting. By adding the space, you tell Ami Pro to treat the characters as text, rather than numbers, thus allowing the forbidden formatting.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing *welcomes your questions and pays $50 for published items.* *See page 12 for contact information.*

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WINDOWS Q&A

Win32s Isn't Everything—But Losing Isn't Anything

Q In order to use Mosaic, I just installed Win32s, the Windows 32-bit extension. Will this benefit my overall Windows system, or only programs that look for this driver? Does it really make my system 32-bit, or does it just fool 32-bit apps into using a 16-bit system?

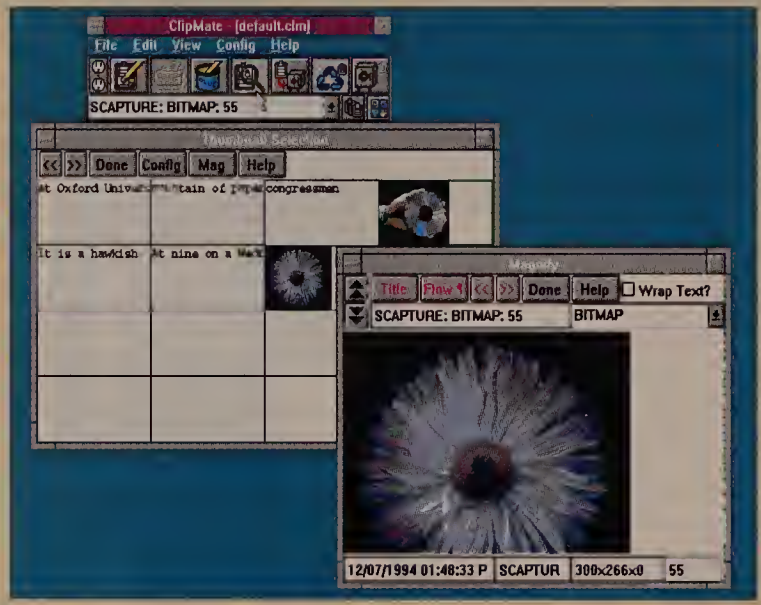
Ed Hansberry, Internet

A Win32s is indeed fooling 32-bit applications into running in a 16-bit environment. Basically, Win32s is a set of files that extend 16-bit Windows so 32-bit Windows applications can run—assuming those apps were written with a subset of the Win32 application programming interface. It doesn't benefit your run-of-the-mill 16-bit Windows applications.

What's more, Win32s will not run most upcoming Win32 apps written for Windows 95 and NT. To make a 32-bit Windows program work with Win32s, the application's designers must sacrifice many features of Win32, including multithreading—and most developers have chosen not to.

Most Win32s applications ship with the needed files, making the upgrade transparent. However, a few programs—mostly shareware—do not. If you have one of these applications, you can download Win32s from a variety of sources, including CompuServe. (At the prompt, type **go mswin32** and search for file **115a.zip**.)

Windows Toolbox



Let's face it, the Windows Clipboard is pretty lame. It can hold only one thing at a time—as soon as you copy or cut something else, the previous item is gone for good. That's why Thornton Software created ClipMate for Windows, a shareware Clipboard extender that stores everything you cut or copy to it. With ClipMate, when you use an application's paste command, you get either the ClipMate item you added last or an older one you selected from ClipMate's drop-down list. For selecting graphics, there's a thumbnail with a magnifier. And you can tell ClipMate not to store clips from a given application. Registration fee: $25. Thornton Software Solutions, 716/227-6505, 716/227-1145 (fax). ClipMate is available as clipmt30.zip from PC World Online and other online services.

Reader service no. 702

The Video Seven Percent Solution

Q I recently added a Video Seven graphics adapter to my computer. Although I have no problem starting Windows in Standard mode, I find that I am unable to start it in 386 Enhanced mode. Can you tell me what's going on?

Michael D. Gore, Lompoc, California

A Certain Video Seven graphics adapters—the FastWrite VGA, V-RAM VGA, and VGA 1024I—are fussy about getting a particular portion of the legendary upper memory blocks (UMBs, the area of memory between the first 640K, or conventional memory, and 1MB). Unfortunately, in 386 Enhanced mode, Windows doesn't know this particular portion of upper memory is unavailable and tries to use it.

You can solve this problem with a quick edit of your system.ini file. In either File Manager or Program Manager, you choose *File•Run*, type **system.ini**, and then press **<Enter>**. Under the [386Enh] heading, add a line that reads **EMMExclude=C600-C7FF**. This tells Windows to avoid the blocks your card uses. Save the file, exit, and restart Windows. This time you should be able to start in 386 Enhanced mode with no problem.

Restoring <Print Screen>

Q When I pressed the <Print Screen> key in the old days, DOS would print the text on my screen to my printer. Now, when I press <Print Screen> in a DOS application running under Windows, the screen is copied to the Clipboard. I have to paste it into another application and print from there, which is time-consuming. Is there a way to restore <Print Screen> to its original DOS function?

Celestina Bridge, America Online

A Sure thing. Just double-click the PIF Editor icon in Program Manager's Main group, then select *File•Open* to bring up the appropriate PIF file. Once the file is up, click the *Advanced* button. In the Options section of the resulting dialog box, check the *PrtSc* option. Then click *OK* and save your PIF. The next time you run that DOS application, pressing <Print Screen> will send the screen contents to the printer (unless the application has reserved that key for another purpose). You may need to use your printer's form feed to eject the page.

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Clock Watching

Q My company requires me to track billable hours using a 24-hour clock. I keep Windows' Clock on my screen in digital mode, but it's a bit of a mental hassle to convert Clock's 12-hour time. Can I make it show 24-hour time? I've looked through its menu to no avail.

Chuck Dixon, Huntsville, Alabama

A No problem. Launch Control Panel from Program Manager's Main window, and double-click the *International* icon. Under Time Format, click *Change*. In the International–Time Format dialog box, you can specify a 24-hour clock. If you don't like colons separating the hours, minutes, and seconds, you can select a different character, such as a hyphen. (If you're feeling mean and want to confuse a colleague, try changing the separator character to a zero when nobody's looking.)

You can also type a short custom message to appear next to the time—for example, **EST** for eastern standard time. When you click *OK* to close the dialog box, the clock shows your new format. If you want to customize the clock's date, click *Change* under Date Format and make your changes there.

Password Me By With Windows for Workgroups

Q Our office uses a Windows for Workgroups network to link computers and share printers. My system is set up to log on to the network automatically each time I start Windows. It prompts me for a password first, which isn't necessary, since my computer is already password-protected. Is there some way I can get Windows to stop asking for a password?

Heidi Sontag, Des Moines

A Yes, there is a way, but since your Windows for Workgroups account isn't tied to your PC, your computer's password protection won't prevent someone else from logging onto your account from another machine.

Now that you've been warned, here's the trick. Although it's not apparent from the Change Logon Password dialog box, you can make Windows skip the password prompt by simply designating a blank password. From Program Manager's Main group, start Control Panel and double-click the *Network* icon. In the resulting dialog box, click the *Password* button in the Options section. In the Change Logon Password dialog box, type your existing password in the Old Password text box; then simply leave the New Password and Confirm New Password text boxes blank, and click *OK*. As a test, try clicking the *Log On* and *Log Off* buttons in the Network dialog box a couple of times. You should no longer be prompted for a password there, nor when you start Windows.

Names of the Game in Windows for Workgroups

Q Okay, I admit it: I have Windows for Workgroups, and I spend a lot of time playing Hearts. Is there a way I can change the game's green background color or customize the other players' names?

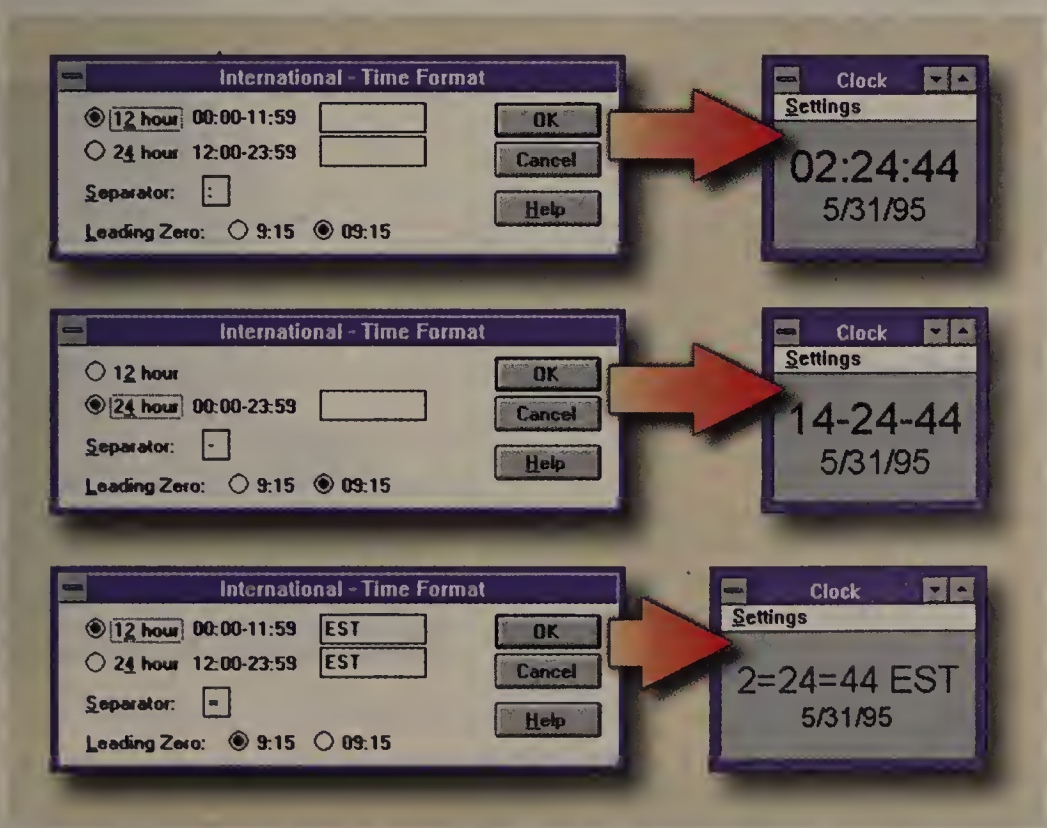
Charles Thornton, Rochester, New York

A Sorry, Charlie, you can't change the background color—but you can make up the names of the other players when you're playing against the computer (as opposed to playing with other folks on the network). It's easy.

First, make a backup of your win.ini file in case something goes wrong. Then choose *File•Run* in either Program Manager or File Manager, type **win.ini**, and press **<Enter>**. When win.ini opens in your Notepad, search for the heading **[Hearts]**. If you can't find it, add the heading immediately above any other bracketed heading. Under the heading, add a line that reads **p1name=** *Fred*, replacing *Fred* with the name of your choice. Add two more lines like this, except begin them with **p2name=** and **p3name=**. Then save the file and restart Hearts. The names you added will now appear whenever you play against the computer.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips and Tricks *(Peachpit Press, 1992).* Windows *welcomes your questions and pays $50 for published items. See page 12 for contact information. The files from this article are available via PC World Online on America Online and CompuServe.*



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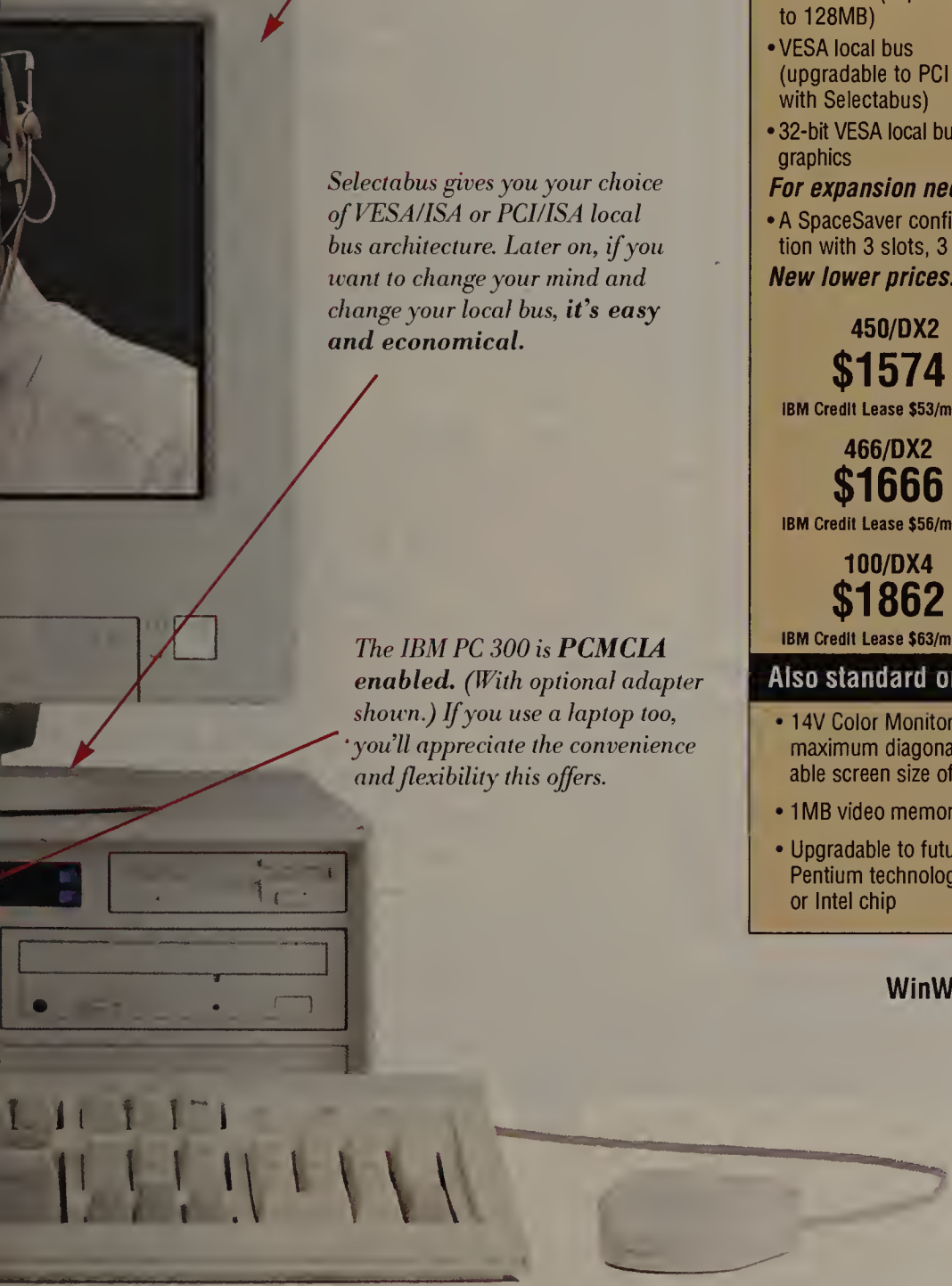

Photo shown with enhanced keyboard and 15V color monitor.

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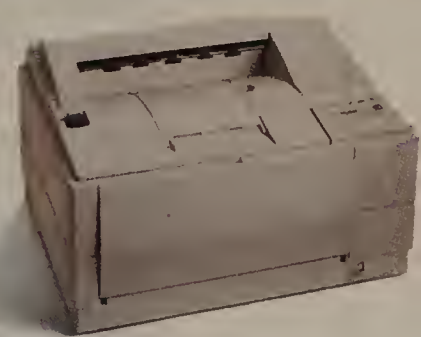

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DATA MANAGEMENT Q&A

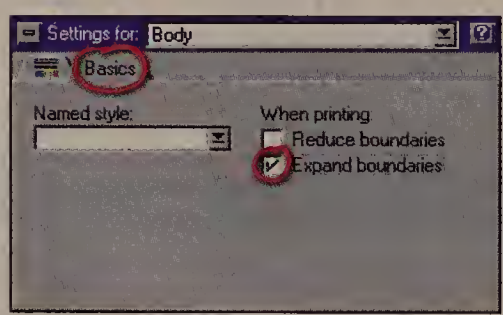
Printing Memo Fields With Approach 3.0

Q When I print variable-length memo fields in Approach 3.0 reports, Approach prints only the first line of the memo. What can I do to get it to print the complete memo field?
George F. Wibberly, Topsham, Maine

A You need to tell Approach to expand the body of your report when it prints memo fields. You also have to change the settings for all the fields in the body of your report so they stretch too—even fields that don't seem as if they need to stretch. Open your report in design mode and follow these steps:

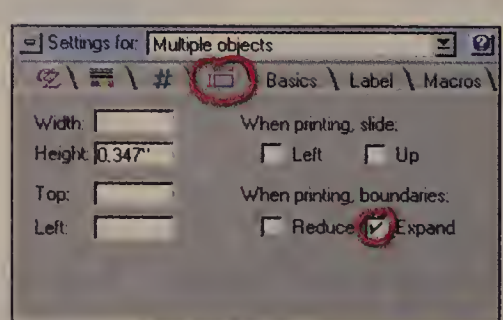
1. Double-click anywhere on the background of the Body section of the report to open its InfoBox. Click the *Basics* tab, then check the *Expand boundaries* option.

2. With the InfoBox still up, click any field in the body of the report, then



hold down **<Shift>** while you click all the other fields individually. (This will change the look of the box somewhat.) Click the tab for dimensions (the one shown circled here), check the *Expand* option under 'When printing, boundaries', and close the InfoBox. Don't worry if your memo field disappears; it will still print.

3. Use *File•Preview* to see how your report will look when it's printed.



Opening One Form From Within Another in Access 2.0

Q My office uses Access 2.0 to manage sales information. I've set up an order entry form that lets me enter only customer IDs already in the Customer table. How do I add a button to take me to my new-customer form?
David McCollough, Raleigh, North Carolina

A Access 2.0 has a Command Button Wizard to guide you through this process. Assuming you already have a customer form, start with your order form open in design mode: Click the floating toolbox's button tool and draw a new button on your form. This launches the Wizard.

On the Wizard's first page, click *Form Operations* under 'Categories', then click *Open Form* under 'When button is pressed'. On the second page, select your customer data entry form. On the third page, select *Open the form and show all the records.*

On the fourth page, select the *Text* option and enter a name—say, **New Customer**. On the final page, name the button **New Customer**. When you click *Finish*, Access returns to your order form with the new button in place.

Depending on the length of its new label, the button may be larger than you drew on the form. If it overlaps another object, move or resize it; if necessary, Access will word-wrap the label.

When everything looks right, click the *Form View* button to leave design mode, then click the new button to see how it works. When the customer form opens, enter a new record and then close the form to return to the order entry form. You should be able to enter the new customer ID for the next order.

Note: If you use a list box or combo box on the order entry form to choose customer IDs, your new entry won't immediately show up in the list. You can make it appear by closing and reopening the order form or by switching in and out of design mode. If you use a regular control box to enter the customer ID, you can enter any new ID in the field. Add a validation formula like **=DLookup("[Customer ID]","Customers")** to ensure you can enter only customers that are already in your customer table.

Printing Multiple Paradox for Windows Forms

Q I often need to print a lot of records using the same Paradox 5.0 for Windows form. I don't want to have to give the command to print each one individually, but when I try to print a form, the Page Range option is dimmed. How do I print multiple forms?
Gary Holden, Bellevue, Washington

A You can't—at least not directly. But you can easily make a report that looks like your form and print your records that way.

First, click the *Open Form* toolbar icon and select the form you need, but don't double-click it. For the Open Mode option, select *Design*, and for Open As, select *Report*. Click *OK* to create your report, and bring it up in design mode.

To make Paradox print one record per page, click in the margin between the ruler and the left edge of the form window, just above the bottom Record line. Close the report and save it. Now when you want to print multiple forms, print the report instead, using *Report•Filter* to limit the records printed.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and author of* The Paradox 5.0 for Windows Handbook *(Random House Electronic Publishing, New York, 1994).* Data Management *welcomes your questions and pays $50 for published items. See page 12 for contact information.*

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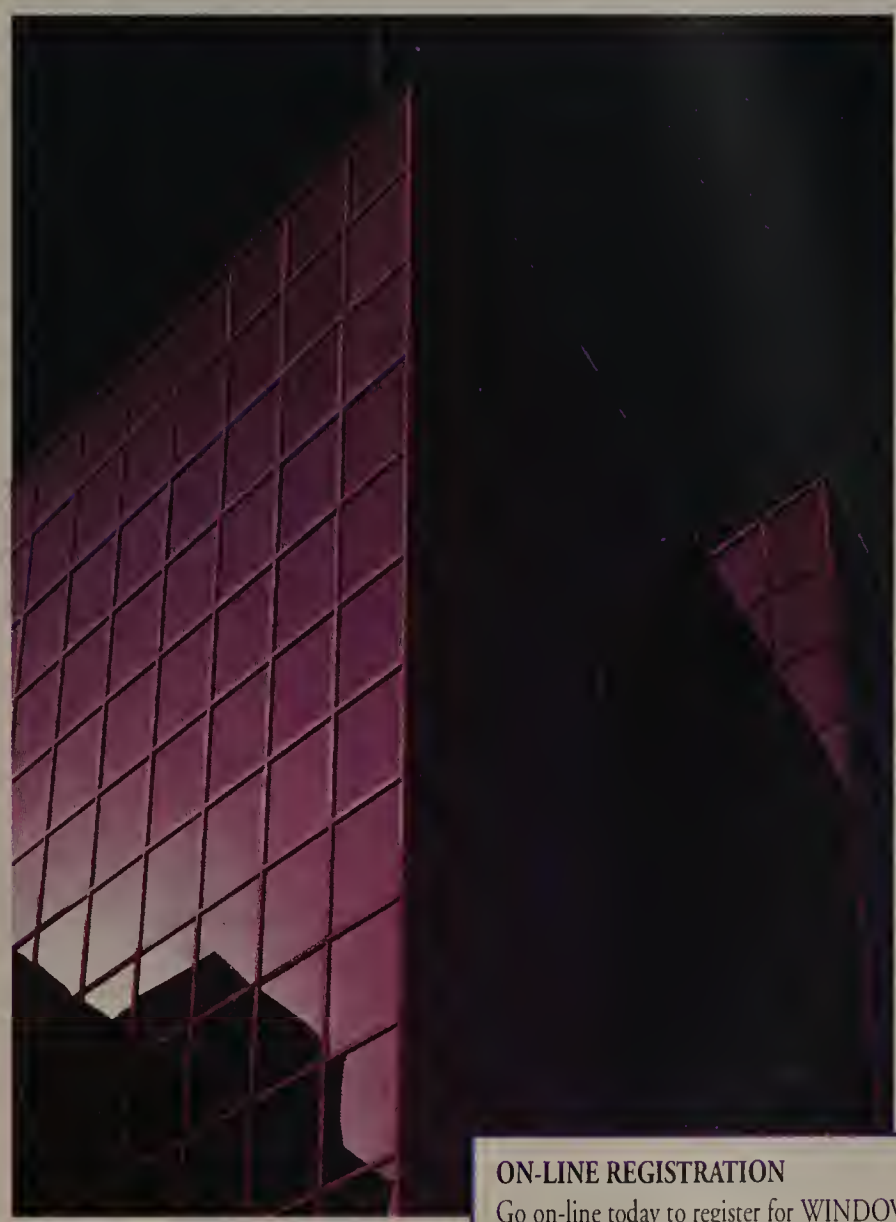

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PUBLISHING & PRESENTATIONS MAKEOVER

Month after month, we hear the same thing from would-be desktop publishers: "I don't have much time or money, but I want my newsletter to look more professional." The *Bridgeton Chronicle*, which goes out to residents of a Florida condominium community, is a classic example. Editor George Moore wanted a design that looked "more official" yet took less effort to produce. So we asked our makeover specialist, Daniel Will-Harris, not only to redesign Moore's newsletter, but also to create a template to be reused issue after issue.

As usual, we used the same tools that built the original—in this case, WordPerfect. We stuck with the same app, but upgraded from its latest DOS guise to the newest Windows version. Windows may have its faults, but it's great for graphics work like this.

Miami Nice

Will-Harris's first design step was to set up a WordPerfect table as the foundation for the newsletter's layout. Usually you'd set up columns, but these can be confusing for DTP neophytes. Tables perform the same function as columns—applying a vertical grid to the page—and also organize material horizontally. Establishing this basic table format makes it easy to maintain a consistent look from issue to issue.

Our designer next turned to the nameplate at the top of the page. He removed the old-fangled illustrations, then chose a new typeface (56-point Kauffmann Bold from Bitstream) that could carry more of the graphics load. The cables were added (with the help of WordPerfect's WP Draw utility) to put the "bridge" in Bridgeton; the palm trees are a piece of Windows Metafile clip art imported into a WordPerfect graphics box.

Like most newsletters, our "before" design used a three-column newspaper layout. But let's face it, the *New York Times* this ain't. In this less formal setting, we opted for two columns instead. Will-Harris defined a header style for the left column, consisting of the title font (Kauffmann Bold) in 24-point type, plus the dotted leaders that separate items. WordPerfect makes defining styles easy: Just format the first example, then choose Autostyle to record the style for future use.

All the News That Fits

We reserved the second column for the newsletter's actual news. We started each item with a bold, secondary head. For the main body text, we chose Bitstream's ITC Cheltenham, 12 point—its generous *x-height* (the height of the main body of a lowercase letter) makes it more readable. Finally, we styled the recurring financial news section at the bottom of the column, each item occupying its own cell within the main table. To further emphasize its importance, we printed it in bold.

Using a table to create a newsletter may seem unusual, but in the case of the *Bridgeton Chronicle*, it works. And with styles, you can format your documents once and then forget about it. After all, isn't the whole point of electronic publishing to make things as easy as possible?

By Valerie Singer and Daniel Will-Harris

Daniel Will-Harris, a designer and author in Point Reyes, California, performed the document redesign. Valerie Singer is a PC World *editorial intern.* Publishing and Presentations *welcomes your questions and makeover candidates.* PC World *pays $50 for published questions and $200 for redesigned items. See page 12 for contact information.*

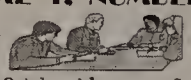
Before

THE BRIDGETON CHRONICLE

BIRTHDAYS ARE LIKE CONGRESS...NEITHER WILL DO ANYTHING FOR YOU... CONFUCIUS

VOLUME 1, NUMBER 5 NOVEMBER 1994

FROM:



During the October 11 meeting of the Board of Directors, the Bernice Allen memorial plaque design was approved. It is in the casting stage now. Mounting, dedication and placement in the Lobby will follow (Dec 13).

At the same meeting, it was announced that Bob Flewelling had resigned. Hugh Clopton was selected to fill Bob's position as Member-at-large. An observation was made that it was a large position and required a person of equivalent stature to handle it.

To bring returnees up to date, Terry Curatolo (407) is the new Secretary of the Board, replacing Bernice Allen who passed in mid-year. Joe Curatolo was the overseer all summer for the major repairs to the pool deck and west wall. It was a hot, gruelling job aggravated by unpredictable rain at undesirable times and worrisome construction problems from olden times. The contractor discovered first one old problem after another as he moved through progressive stages of completion.

Just a few days before the Pool was open, our Housekeeper, Phyllis, meticulously cleaned each chair, lounge chair, and table (top, bottom, and legs of each piece).

Because the deck is new and under warranty, please remember to lift the piece of furniture you want to relocate so as not to scratch the deck. If it is damaged, the warranty is voided and we are liable for even more expense to repair it.

And if you drop any greasy foodstuff on the new deck, please, please pick it up immediately as the grease will damage the deck as well.

WANNA HELP GIVE A CHILD A BIG SURPRISE AT CHRISTMAS??

Donate your unused or unwanted, bike. There are many of these in the bike racks in the garage. Some look as the they haven't been used for years and years. Some may even belong to long-gone residents.

If you haven't exercised your bike in the past year, if you've forgotten you even have a bike, or if you're just tired of having a bike, if you cannot pedal fast enough to stay upright or have any other excuse, NOW is the time to make it live again!! And you don't even have to remove the rust or pump up the flat tires! Just call 'Nita at 866-1521 and give her the info. She guarantees to find your bike a happy home. Just think how happy some youngster will be on Christmas morn.

FREE POOL PICNIC COMING SOON AT YOUR FAVORITE POOL Watch the bulletin board.

FINANCIAL NEWS OF THE MONTH

Op Cash	$14665.36
Res Cash	77585.18
Other	109.75
TOT ASSETS	$92360.29

"CREATIVITY IS PRODUCTIVITY"

After

The nameplate and motto take on added importance when they perform double duty as graphical elements.

Bridgeton Chronicle

The strength of a nation derives from the integrity of the home... Confucius

Board Report October 1994

Bernice Allen Memorial. During the October 11 meeting of the Board of Directors, the Bernice Allen memorial plaque design was approved. It is in the casting stage now. Moun dedication, and placement in the Lobby will follov December 13.

We created the newsletter in a WordPerfect table—an uncommon design choice, but one that's easier than working with columns alone.

Headers and their accompanying dotted rules were created as Autostyles for effortless editing and updating.

Member-at-large. At the same meeting it was ann Bob Flewelling had resigned. Hugh Clopton was se Bob's position as Member-at-large. An observation that it was a large position and required a person c stature to handle it.

New Secretary. Terry Curaltolo (407) is the new *Secretary of the Board,* replacing Bernice Allen.

Pool deck and west wall repairs

Repairs complete. Joe Curaltolo was the overseer all summer for the major repairs to the pool deck and west wall. It was a hot, grueling job aggravated by unpredictable rain at undesirable times and worrisome construction problems from olden times. The contractor discovered one old problem after another as he moved through progressive stages of the work.

Important Deck Care. Because the deck is new and under warranty, please remember to *lift* the piece of furniture you want to relocate so as not to scratch the deck. If it is damaged, the warranty is voided and we are liable for ever expense to repair it. *Grease* will also damage the *please pick up anything greasy you drop.*

We could have demanded that the rules and headlines in the first column line up with the main text, but we declined: To do so would have required too much advanced formatting.

Help a child for Christmas

Donate your unused or unwanted bike. If you your bike in the past year—*now* is the time to m again! You don't even have to clean or fix it, just 555-1521 and give her the info. She guarantees to bike a happy home—just think how happy it will some youngster!

Financial news, a recurrent feature, is made visually distinct by an all-boldface format.

...ber 12

Free Pool Picnic! Enjoy the new deck and mingle with the neighbors. Bring your favorite dish to share!

Financial News of the Month

Op Cash	$14,665.36
Res Cash	77,585.18
Other	109.75
Total Assets	$92,360.29

Volume 1, Number 5 *Creativity is Productivity* *November 1994*

Volume and issue information and a second motto are displayed in a footer for easy revision and automatic positioning.

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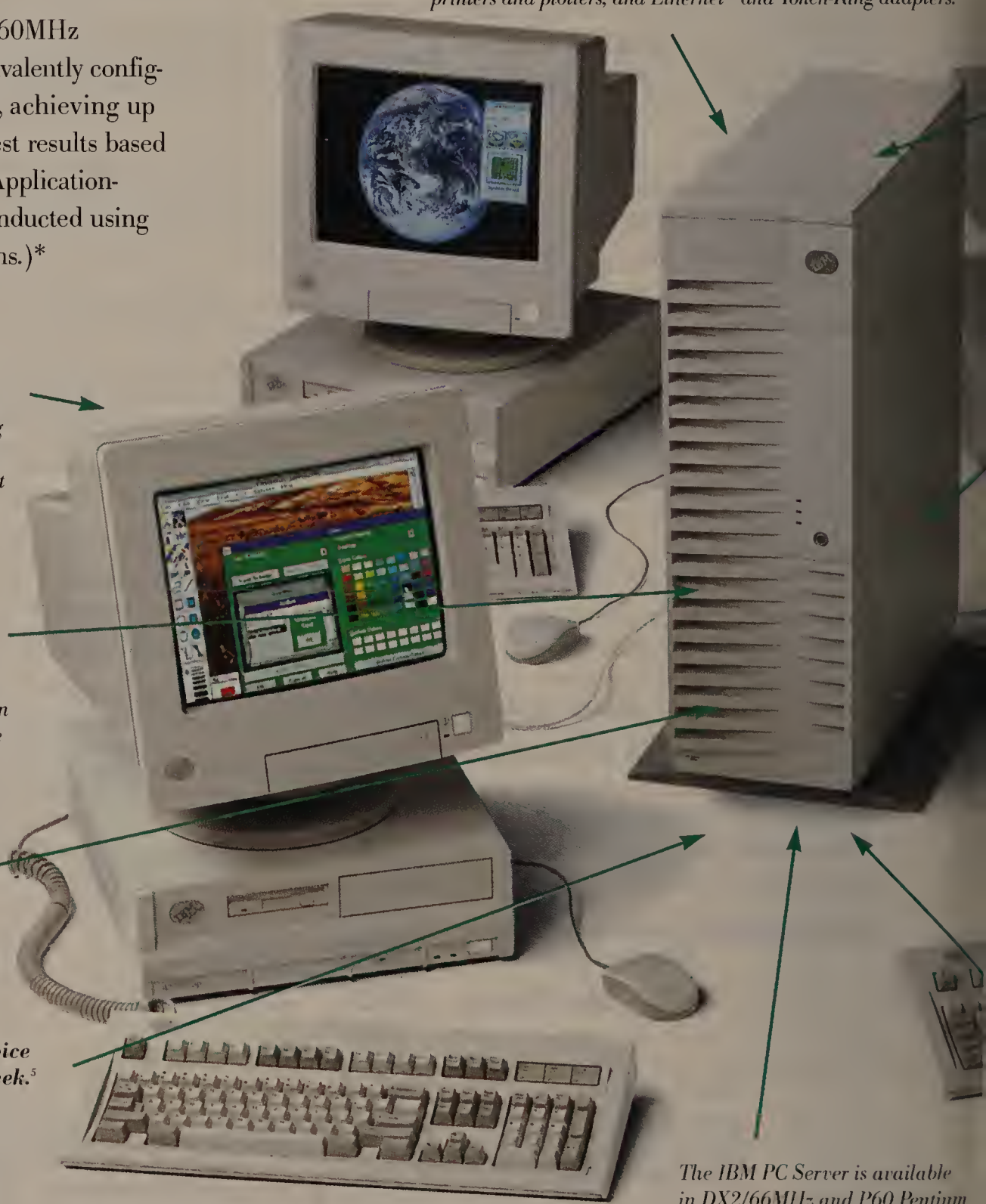

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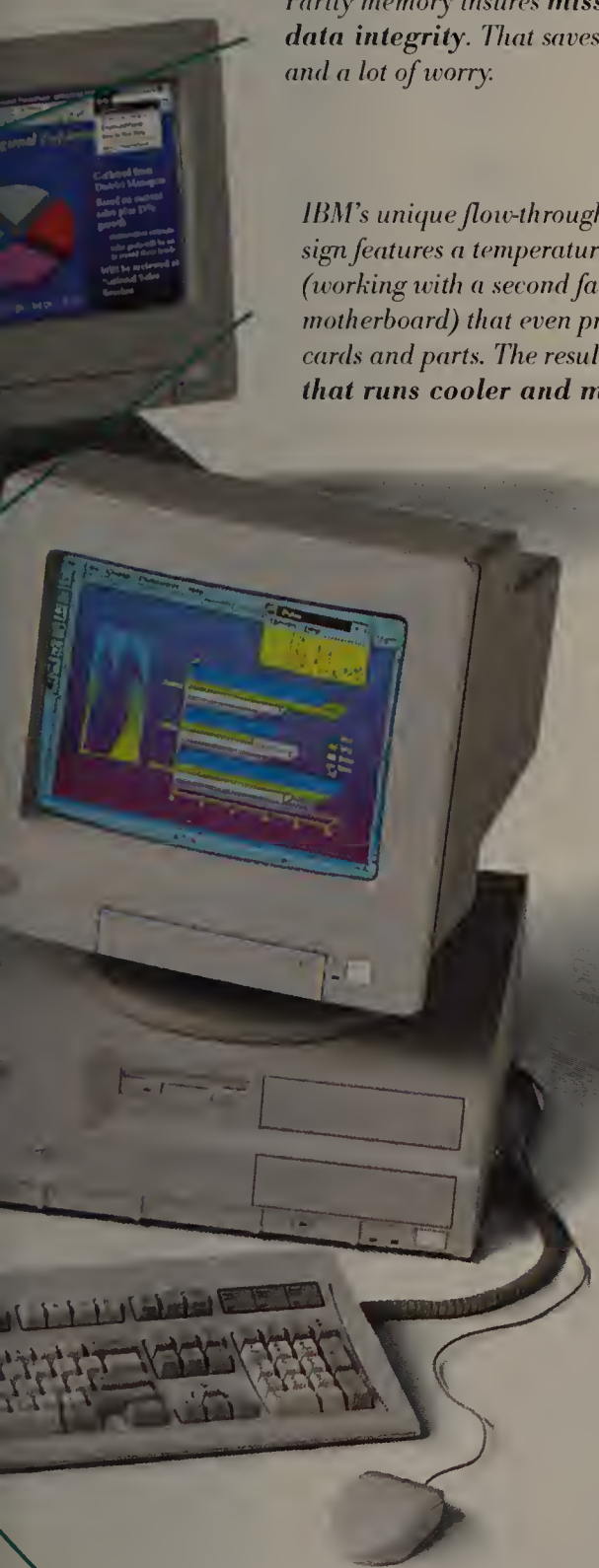
world performance that the competition.



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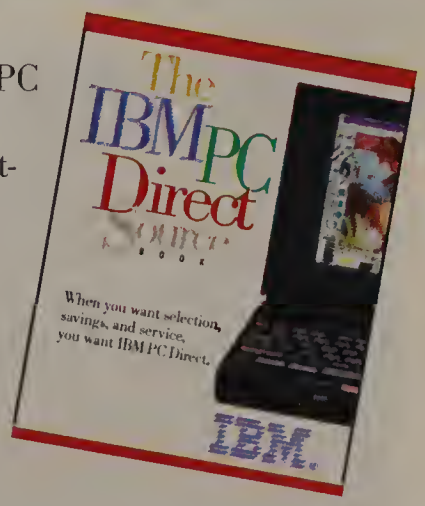

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ONLINE Q&A

Cheap but Valuable Business Info

Q What is the cheapest, best source of online business information that you know of?
Paula Zitzner, Olympia, Washington

A Without a doubt it's the Information Please Business Almanac on CompuServe. It provides well-researched information on hundreds of business topics, including noncompete agreements, incorporation, finding a lawyer, applying for government contracts, obtaining free government resources, hiring employees, and getting business loans, as well as information on broad topics such as manufacturing and marketing. It tells you what to do and where to go, and it's an invaluable resource for anyone who's starting a new business.

To reach it, type **go bizalmanac** or, if you're using WinCIM, click on the *Finance* icon. However you get there, it's part of Basic Services, so you won't pay any by-the-minute charges to tap in.

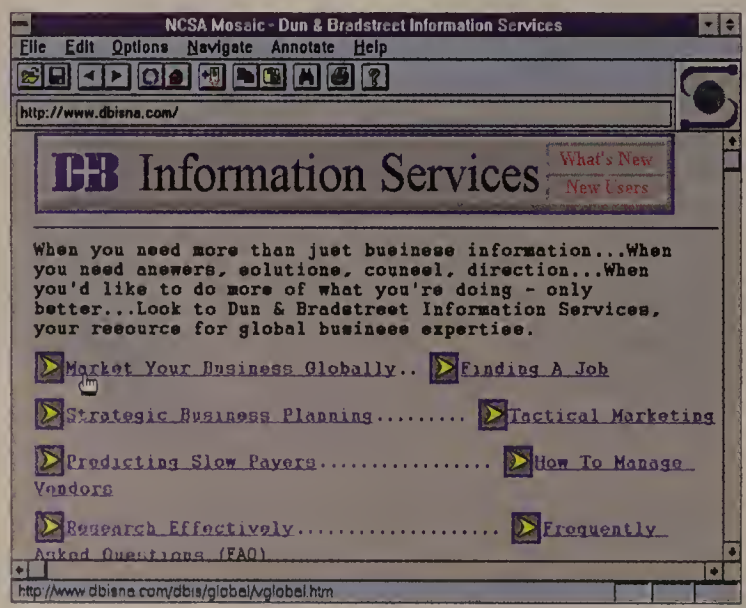
CLICK THE FINANCE ICON in WinCIM's opening screen to access the Information Please Business Almanac.

Where to Start Your Web Surfing

Q I just got an Internet account with access to the World Wide Web. I guess I'm not a very good Net surfer, because I keep ending up in some virtual reality art gallery with weird stuff on the "walls," and I can't seem to find my way to the things that I'm really interested in. Can you help me?
John Raminey, Los Angeles

A The best starting points for Web neophytes are the innumerable "Best of" sites found all over the World Wide Web. These sites separate the wheat from the chaff, so you spend less time wandering about aimlessly. Some of the better-known "Best of" pages include Best of the Web '95 (**http://wings.buffalo.edu/contest/boweb95.html**) and GNN's Best of the Net (**http://www.dec.com/gnn/wic/best.toc.html**). But my personal favorite is Ward Mundy's Best of the Internet page at **http://www.mindspring.com:80/~wmundy/**. (Those of you who have good memories may remember Ward Mundy as the guy who made a killing back in the mid-eighties by writing a shareware dBASE clone called Wampum.)

Mundy's page is particularly good for its links to all kinds of business information. From it, you can click your way via hypertext links to Dun & Bradstreet's home page, the Internet Computer Index, the Best of the Internet directory, the Internet Business Directory, Business Sites on the Web, CommerceNet, the Web Server Index, and the Virtual Reference Desk. You can even find free stock quotes and the Usenet FAQ directory. And, of course, from all of these pages you can click your way to even more great spots.



DUN & BRADSTREET'S HOME PAGE is one of the cool sites accessible from Ward Mundy's Best of the Internet page.

Hunting for the Hidden Wisdom of the Net

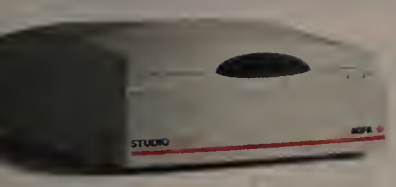
Q Do you know if there's some easy way to find Internet FAQs? I'm tired of hunting for them in each Usenet news group.
Peter McGaffrey, North Reading, Massachusetts

A FAQs, or frequently asked questions, are files containing answers to questions that Internet news group users tend to ask over and over. Thousands of FAQs circulate through the Internet, covering every conceivable topic—from how to restore a blasted credit record to reviews of French restaurants around the world. Computers are the most common topic. FAQs offer some of the best consumer advice, computer advice, and all-around life advice you'll find anywhere.

Most Usenet FAQs are posted regularly in the news.answers news group. If you have access to the World Wide Web, you can connect to **http://www.cis.ohio-state.edu/hypertext/faq/usenet/FAQ-List.html**. Once there, you can search the Usenet news group list and download the FAQs you want, all with a few clicks of your mouse.

But perhaps the easiest way to look for FAQs (especially if your Internet access is limited) is to send an E-mail

WHAT OUR ENGINEERS HAD IN MIND WHEN WORKING ON OUR NEWEST SCANNER.



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Circle 51 on reader service card

message to **mail-server@rtfm.mit.edu**. Leave the subject blank, and type the line **send usenet/news.answers/index** followed by the line **help**. The computer sends you an index of the FAQs available on Usenet, as well as a file explaining how you can request them.

But Usenet is only the beginning—there are even more FAQs associated with Internet mailing lists (subject-specific conferences conducted via E-mail). For example, while doing some research for a book, I located 5 FAQs on the subject through Usenet, and 58 more through mailing lists. Moreover, I found that the mailing list FAQs were generally more valuable than those from Usenet.

To find these "hidden" FAQs, you need to first scout for mailing lists on the subject you're interested in (see "Getting On Internet Mailing Lists," *Online*, February 1995). Although you don't always need to be a mailing list member to request FAQs, it's easiest if you subscribe first, because you'll receive an E-mail message from the mail server that tells you if any FAQs are available and how to get them.

Making Your Modem Reliable

Q When I was installing ProComm Plus for Windows, it asked if I wanted to install autoreliable, reliable, or MNP mode. I had no idea how to respond. What do these terms mean, and which should I use?
John Gerald Nitschke, Green Bay, Wisconsin

A Your modem offers three flavors of data compression and error correction. In autoreliable mode, it first tries to establish a V.42/V.42bis connection. If that fails, it tries to connect with slower MNP protocols, and if *that* doesn't work, it connects with no correction or compression. Autoreliable offers the best connection and is the most likely to connect successfully with other modems. Reliable mode varies by modem: Some will attempt an MNP connection and hang up if that doesn't work; others insist on a V.42/V.42bis connection. MNP mode probably means ProComm will try various MNP levels and then, if those fail, establish a non–error-correcting link. For the definitive answer, check your manual.

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of* I Lost My Baby, My Pickup, and My Guitar on the Information Highway *(No Starch Press, Daly City, California, 1995).* Online *welcomes your questions and pays $50 for published items. See page 12 for contact information.* ■

POWER TIP no. 318

Floppy Data Be Gone for Good

Remember that the data you no longer think is important may be so to the unscrupulous. You should destroy sensitive data on a floppy disk using the FORMAT/U command; data erased with DEL or ERASE can be recovered using the UNDELETE command. Don't be tempted to speed up operation by adding the /Q switch to the FORMAT command, because that will prevent FORMAT from permanently erasing the data.

Ken Johnson
Oak Park, Illinois

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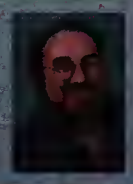
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"The Best of 1994"

"The search for the perfect grab bag of graphics utilities is never ending... HiJaak Graphics Suite, Version 3.0, offers the closest thing to one-stop shopping on the market."

PC MAGAZINE
January 10, 1995

HiJaak Graphics Suite has all of the tools to help you make your graphics and documents "Look Good". Forget those fancy high priced software packages. HiJaak Graphics Suite gives you more bang for your buck. It's the low-sweat way to get your documents read and acted upon.After all, that's why you create those reports, letters, and presentations, to influence, convince, inform, educate, and persuade your customers to purchase your products or services. HiJaak Graphics Suite gives you a great set of powerful, easy to use graphics programs. Everything you need is included: painting, drawing, enhancing, capturing, converting, and tracing software all tied together elegantly with the finest graphics management system yet, HiJaak Browser. Even if you already own a drawing package, HiJaak Graphics Suite gives you the flexibility you need to easily use, enhance, manage, search and find all your graphics. Also included is 3,000 pieces of quality, pre-keyworded easily searchable art on CD-ROM. It's all ready to customize or use as is, for those of you who can't draw a straight line with a ruler. HiJaak Graphics Suite is here to bring you the success your ideas deserve **at a price that can't be beat!**

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Circle 116 on reader service card

HARDWARE Q&A

Memory Mishmash

Q I have a 486DX-33 system with four 1MB 30-pin SIMMs. I have four SIMM slots left, and I'd like to upgrade to 8MB by buying a single 4MB SIMM. However, I see all kinds of 4MB SIMMs advertised—4x9, 4x8, 4x3, and so on. What kind of memory should I buy?
Steve Arnold, Internet

A You may well ask, since the way that memory is advertised is utterly confusing. First, the bad news: Because your system uses 30-pin SIMMs, you can't upgrade using a single SIMM. The 486 is a 32-bit CPU, and 30-pin SIMMs are 8 bits wide, so you need to upgrade your SIMMs four at a time—that is, you must install four 1MB SIMMs to reach 8MB. If you ever want to upgrade again after that, you'll need to replace one bank of 1MB SIMMs with four 4MB SIMMs, creating a whopping grand total of 20MB.

As to what kind of memory you need, you've already established the basics: Your system takes 30-pin SIMMs instead of 72-pin SIMMs (the latter *can* be added one at a time, by the way). Now you need to check your system manual to see whether your PC requires parity memory and, if so, how fast that memory must be.

Parity memory includes an extra bit per byte, which some systems use to check for memory errors. You'll see 1MB parity SIMMs advertised as 1x9, because they're 1MB with a 9-bit path (8 bits for data and 1 for parity). If your system uses nonparity memory, buy a 1x8 SIMM, which lacks the bit for parity checking. And what exactly is a 1x3 SIMM? It's a 9-bit parity SIMM with only three chips on it (1x9 SIMMs have nine chips, but just to confound you, 1x8 SIMMs have either eight or nine). See the accompanying table for a rundown of all these SIMM ratings.

As for speed, the vast majority of systems now take either 70ns (nanosecond) or 80ns memory; PCs that take 60ns or 100ns SIMMs are pretty rare. Just match the memory speed of the SIMMs you buy with the speed listed in your system manual. Remember that buying faster memory than your system requires won't help—in fact, it's been known to cause errors.

SIMM Memory Boards

Advertised rating	Capacity, pins, parity status
1x9	1MB 30-pin parity
1x8	1MB 30-pin nonparity
1x3	1MB 30-pin parity
4x9	4MB 30-pin parity
4x8	4MB 30-pin nonparity
256Kx36	1MB 72-pin parity
256Kx32	1MB 72-pin nonparity
512Kx36	2MB 72-pin parity
512Kx32	2MB 72-pin nonparity
1x36	4MB 72-pin parity
1x32	4MB 72-pin nonparity
2x36	8MB 72-pin parity
2x32	8MB 72-pin nonparity

BREAKING THE MEMORY CODE: what the numbers mean in PC memory ads. Besides number of pins and parity, check the nanosecond speed rating against what your system's documentation recommends.

The Perils of PCI

Q Are PCI systems safe to buy? A couple of people who bought PCI systems told me they'd had problems that were very difficult to fix.
Tad Jones, Junction City, Oregon

A Like many new technologies, PCI (Peripheral Component Interconnect, the souped-up expansion bus found in nearly all Pentium systems) got off to a rocky start. In many instances, PCI systems and expansion boards simply wouldn't work together, causing system crashes and lockups that could be cured only by removing the offending device. Smart buyers made sure that the system manufacturer had successfully tested their PCI peripherals—and that a money-back guarantee was part of the bargain.

Fortunately, PCI's compatibility problems were solved more than a year ago with the introduction of the PCI 2.0 spec (we're up to revision 2.1 at this writing). If both board and system are of this vintage, everything should work. Any new PCI hardware you buy today will almost certainly be PCI 2.0 or later, but ask your salesperson to make sure. The money-back guarantee is always a good idea.

Squinting in the Great Outdoors

Q I used to take my laptop outside to work in the open air. Then I upgraded to a notebook with a dual-scan color LCD screen with rich, bright colors—indoors, that is. Outside, I can't even see the screen. Is there a screen color combination that works best in daylight? What type of color screen has the highest visibility outdoors?
Bruce Ammerman, Internet

A Color LCD (liquid crystal display) screens are dimmer than black-and-white ones, because the backlighting must pass through color filters and because the screen creates colors by turning off some subpixels and leaving others on (there are three subpixels—red, green, and blue—for every pixel in a 640-by-480 color image). The highest-contrast combination is black and white, since white turns on all the subpixels and black turns them all off.

No matter what you do, though, your dual-scan color screen will still be too dim to use outdoors. Even an active-matrix color LCD—the brightest and most expensive color notebook screen that you can buy—isn't usable outside, except maybe deep in the woods on a cloudy day. The backlighting behind a color screen simply can't compete with daylight.

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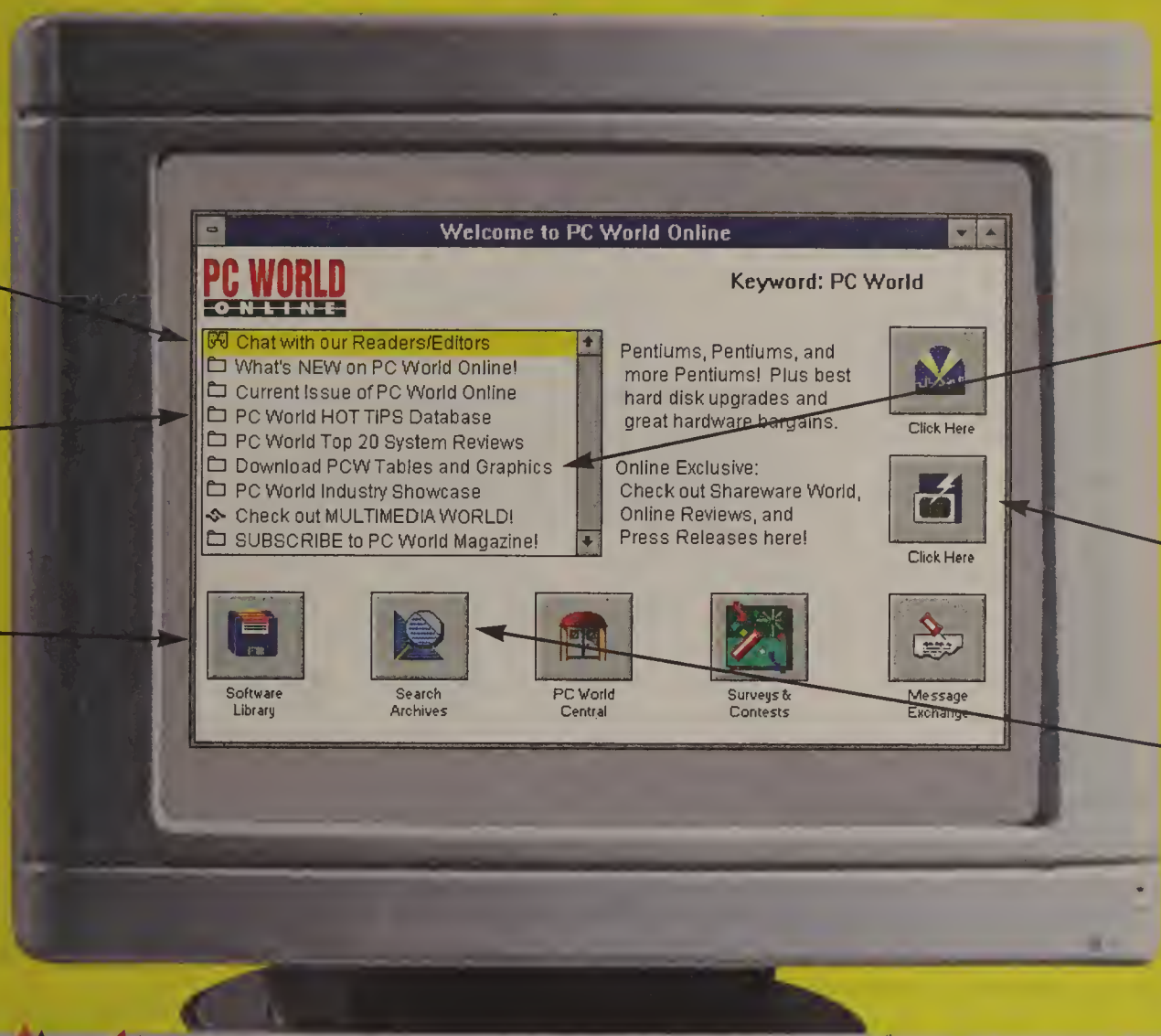

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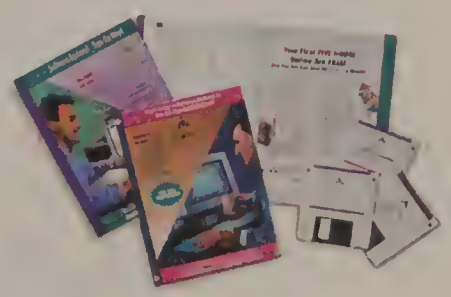

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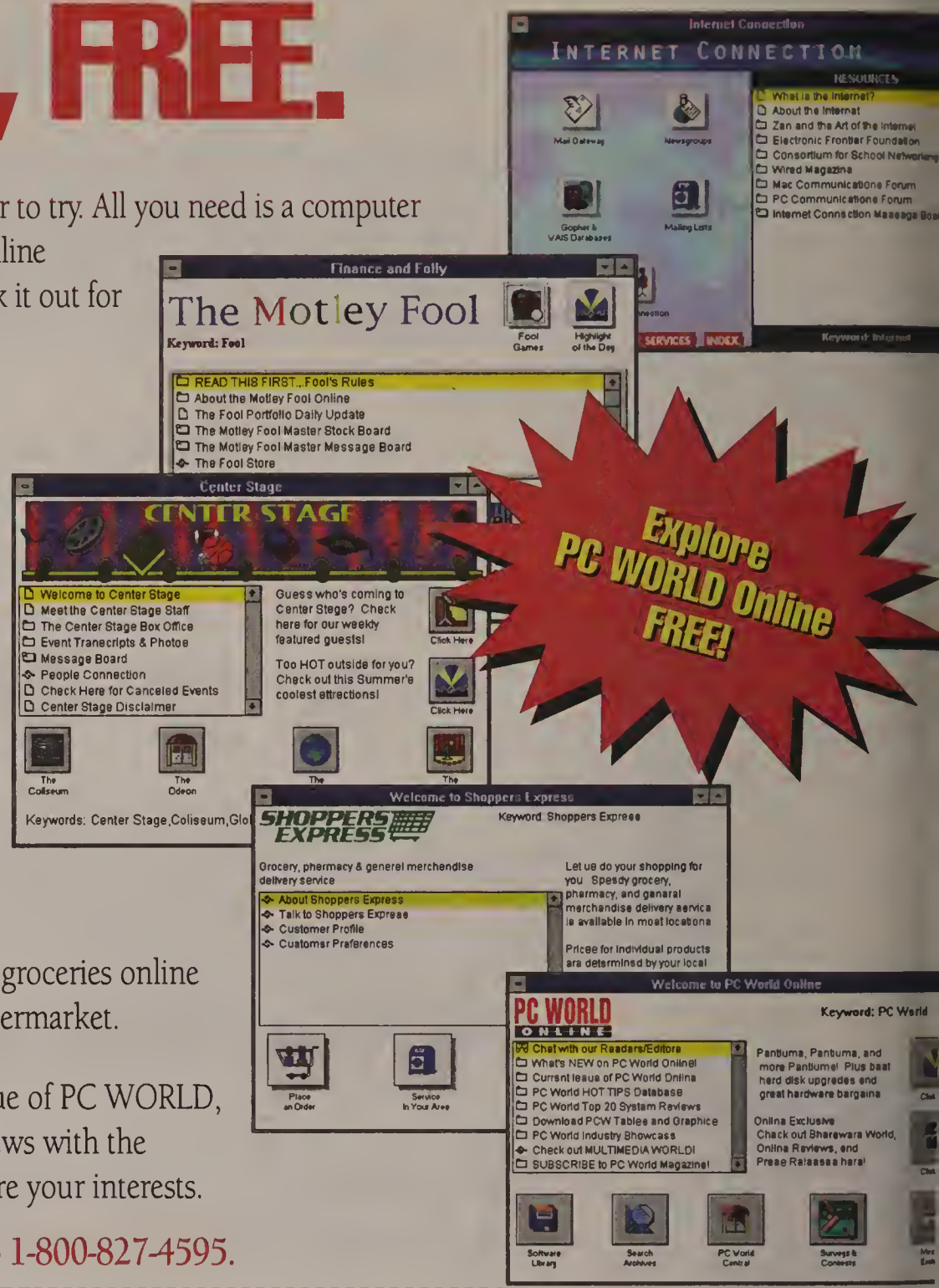

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Your best bet for outdoor computing is what you probably used before: an old-fashioned reflective screen, which relies on ambient light instead of backlighting (just like a digital watch). Unfortunately, these aren't available in color, and only handheld PCs still offer them.

Monitors and Measurements

Q Last month I ordered a Gateway 2000 PC with a 15-inch monitor. When I received the system, however, the screen measured slightly less than 14 inches diagonally. Am I missing something here?
Mike Johnson, Bingham Canyon, Utah

A Exaggerating monitor size is standard practice throughout the industry. The manufacturer tells you that the CRT (cathode ray tube) measures 15 inches diagonally, but the bezel surrounding it covers part of the screen. The advertised sizes are thus technically correct, but the world would be a better place if monitor manufacturers identified their wares by the diagonal measurement of the usable screen area and didn't count the hidden part. There's so much hype out there. (See "Buyer Beware" in this issue's *Top of the News*.)

Prepare to Plug and Play

Q If I buy Plug and Play expansion boards now, will they work in a system without Windows 95? (In case you're wondering, I'm *not* interested in trying Intel's complicated Plug and Play software for DOS and Windows.)
Amelia Atenus, Plano, Texas

A Without either Windows 95 or Intel's Plug and Play utility, your system can't automatically configure Plug and Play expansion boards. However, it's still worthwhile to buy Plug and Play hardware *now* in preparation for Windows 95, which will almost certainly make hardware configuration much simpler than it is today.

Although Plug and Play promises to do away with switches and jumpers altogether, most current Plug and Play expansion boards come with a special jumper that enables you to switch between Plug and Play and standard operating mode. So when Windows 95 finally arrives, you simply move the jumper and enjoy the benefits of automatic hardware configuration.

Instant OverDrive Upgrades

Q On the motherboard of my Compaq ProLinea 486SX-25, I found a jumper that selects the clock speed. If I were to move the jumper from the 25-MHz position to the 33-MHz position and install a 33/66-MHz OverDrive chip, would I have a DX2-66? It can't be that simple, can it?
Phil McCole, Nantucket, Massachusetts

A Well, as a matter of fact, it really can. I couldn't have described the process better myself.

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, Berkeley, California, 1995).* Hardware *welcomes your questions and pays $50 for published items.* *See page 12 for contact information.* ■

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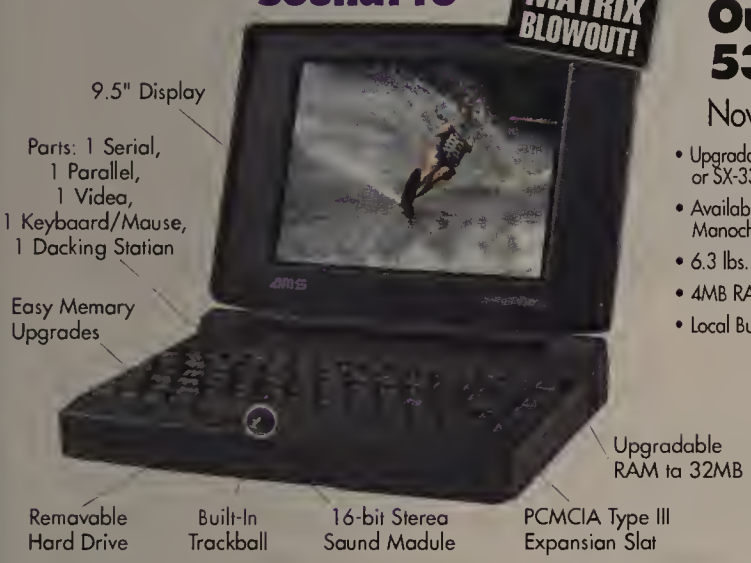

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STAR-DOT-STAR TIPS

Decrypting DMF Disks

A colleague of mine recently purchased an early version of Microsoft Office and then received an upgrade to Excel 5.0c. The floppies the upgrade arrived on were formatted using Microsoft's DMF [Distribution Media Format]. My friend wanted to make a backup set before installing the product, but the unusual format made this impossible. My friend brought the floppies to me, and we tried DISKCOPY; it didn't work. Nor could we use XCOPY to transfer files to the hard disk and back to a floppy. Finally, we tried backing up the disks using version 3.05 of the shareware program CopyQM, which can even copy disks to other disks of different sizes (for example, 5¼-inch to 3½-inch) while preserving the same format and capacity, but we had no success.

I called Sydex, the maker of CopyQM, and the company sent the new version, 3.18, which was able to do the job. So if your readers are having problems making backups of DMF disks, CopyQM 3.18 is the way to go. It also does a number of nifty conversions. I hope screwy disk formats that wreak havoc with software backups don't become a trend.

Mark Lees, San Francisco

Editor's note: Unfortunately, while Microsoft claims that DMF is merely a way of cutting costs by packing more files onto each floppy, it's also a weak form of copy protection that can give the average user a hard time making backups. DMF packs 21 sectors onto every track instead of the usual 15, and you need special software to read from or write to DMF floppies. Microsoft's Extract utility, found on the first floppy of a DMF disk set (which, naturally, is not DMF formatted), is one such program, and it's a simpler alternative to CopyQM if all you need to do is copy files from DMF floppies. Using Extract, you can back up a DMF floppy set to your hard disk (the program lets you copy only one file at a time), but the process is painstaking, and the utility doesn't format floppies, ruling out duplicate sets.

If, like Lees, you need to duplicate DMF disks, try either the inexpensive CopyQM 3.18 (earlier versions can't handle DMF) or the public-domain FDFORMAT utility. You can find both on PC World Online as **COPYQM.ZIP** and **FDFO.ZIP**, respectively (see page 12 for more information). FDFORMAT works in conjunction with a TSR (included in the ZIP file) that lets you read and write 1.72MB floppies—the format used by DMF.

If you want a program that will copy not only DMF disks but virtually any PC disk that has ever existed, look into Quaid Software's CopyWrite. When it comes to making backups of protected disks, CopyWrite is better than any similar program—and now that Central Point Software no longer sells Copy II PC or the Copy II PC Option Board, it may well be the only game in town. CopyWrite can even back up disks that are protected with unusual physical schemes, such as laser holes in the disk or Vault's devilish Everlok (which has locked me out of a legitimately acquired program more than once). There is only one catch: Because CopyWrite was carefully written to work well on older, slower machines (such as 286s), the current version may not run on some faster ones.

- **CopyQM 3.18** $25; Sydex; 800/437-9339, 503/683-6033, 503/683-1622 (fax)
  Reader service no. 611
- **CopyWrite** $75, Quaid Software; 519/942-0832, 519/942-3532 (fax)
  Reader service no. 612

Fly out a Different Window

If you like the effect of the Flying Windows screen saver that comes with Windows and Windows for Workgroups 3.1 and 3.11, but you'd rather see something other than the Windows logo, you can. When I noticed that the flying logos start small, then grow, it occurred to me that they might have been drawn with scalable TrueType fonts. I went through the Wingdings font and discovered that the last character (ASCII 255) contained the logo; sure enough, changing the character can make a different symbol (say, *your* company's logo) fly around the screen.

To make the change, start by backing up the Wingdings font file, **WINGDING.TTF** (I just copied mine from the default WINDOWS\SYSTEM directory into a different one). Next, use a font editor to replace the last character of the original font with your own symbol. I used CorelDraw to create a new character, then exported it to the Wingdings TrueType file, but you could simply assign another Wingdings character to ASCII 255, or borrow a character from another font.

After you're done, restart Windows, go to the Control Panel's Desktop applet, and give the Flying Windows screen saver a test. Your logo (or whatever symbol you drew) will fly across the screen.

Mohd Asri Abdul Aziz, Kuala Lumpur, Malaysia

USER GROUP TIP

Running on Empty in Quicken

To stop Quicken for Windows from automatically loading the file you used in the last session, hold down <Ctrl> as you double-click the Quicken icon in Windows' Program Manager. I use this trick because I work with many companies' files and prefer that Quicken not load the last account I worked on.

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Editor's note: CorelDraw has long offered great font utilities, and older versions of the program are still available for as little as $100. You can also use a font-editing program, such as DS Design's $119 Type Designer.

The secret to making this trick work with CorelDraw is to follow the instructions hidden in the program's online help under the heading 'Creating Adobe Type 1 and TrueType compatible fonts and symbols'. To see the instructions in CorelDraw 4, press **<F1>**, then **S** for Search. Then type **truetype** and press **<Enter>**. (CorelDraw versions 3 and 5 also let you edit fonts, by the way.) Technical notes explain how to combine the parts of your drawing into an outline suitable for export as an Adobe Type 1 or TrueType font. I did so, and several large bowling balls now bounce around on my screen.

- **Type Designer** $119; DS Design; 800/745-4037, 919/319-1770
  Reader service no. 613

Renewing Windows Resources

If Program Manager is brimming with program groups, or your font lists are overflowing (CorelDraw installs a huge selection), you may find that Windows slows down or even becomes unstable due to a shortage of system resources. The best way to solve this problem is to get rid of this unnecessary baggage.

To remove unwanted Program Manager program groups, simply minimize them, then highlight them and press **<Delete>**. You don't have to remove fonts from your hard disk to reclaim the resources they use; just uninstall them using the Fonts applet in the Control Panel.

Jonathan Kestrel, New York

Editor's note: Many of Windows' memory areas are limited to 64K of RAM, even in 386 Enhanced mode. Among these are the storage areas needed to track program groups and fonts. It pays to cut back on program groups to prevent Windows from running out of system resources. If removing program groups isn't enough to accelerate or stabilize Windows, try uninstalling fonts. Also, scan WIN.INI and SYSTEM.INI for sections associated with hardware or software that's no longer installed. (Each section begins with a line containing one or more words in square brackets.)

Putting In a Plug

In most situations, mucking around in the back of an electrical appliance without unplugging it can be dangerous to you. But mucking around in the back of your PC while it's unplugged can also be dangerous to the computer. This is because static electricity from your clothing, the rug, the cat, and so forth can nuke delicate static-sensitive components such as CPUs and memory chips. If your PC is plugged into a properly grounded outlet, the ground lead will conduct static charges away when you touch the system's chassis. Unplug your PC before adding chips or changing boards, however, and you're in danger of frying them with static—particularly in dry, wintry climates—because the machine is no longer grounded.

Nevertheless, you don't want to dive into your PC willy-nilly with no protection against shocks from household AC current. While virtually all PC power supplies are enclosed in metal panels, some machines do have wires running from the power supply (normally in the back of the case) to an AC power switch on the front, and there's a small—but real—risk that you could touch a poorly insulated switch contact and get zapped.

So what's a computer owner to do? As it turns out, the best way to deal with the dilemma of To Unplug or Not to Unplug is to do a bit of both. Plug your PC into a grounded AC power strip with a switch, and switch off both the PC and the power strip before opening the case. This strategy will keep the case grounded, so you can touch it to discharge static electricity as you manipulate chips and boards, and it will simultaneously ensure that AC power is disconnected from the computer. Finally, if fooling around inside a computer that's attached to a power strip gives you the willies even when the strip's switch is turned off, unplug the system and ground it to earth directly by connecting the power cord's ground pin (the round one) to a copper or steel cold-water pipe, using a piece of copper wire.

Chip Zappa, Los Angeles

Editor's note: A plugged-in but turned-off power strip is the best way to keep your PC grounded while you change sensitive components. Don't leave the survival of a $300 CPU upgrade, an $800 SIMM, or an expensive new hard drive to chance when this simple technique (best used while keeping a hand on your PC's case) can make your machine nearly zap-proof.

One thing, though: This technique will work only if your outlet really is grounded—just because it accepts a three-pronged connector doesn't mean that the ground lead is actually connected to earth. If you're not positive, buy an outlet tester (about $5 at your local hardware store or Radio Shack), which can test an outlet for correct polarity and a good ground.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs and pays $50 to $200 for published items. See page 12 for contact information.*

POWER TIP no. 319

Quick Ventura Publisher Column Changes

Need to change the column width of a table quickly in Ventura Publisher? Select the Table tool, hold down <Alt>, position the mouse pointer in the column you want to change, hold down the left mouse button, and then drag the right column guide to the new location.

Steve Bass
Contributing Editor

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1-2-3 RELEASE 5.0 FOR WINDOWS

The top of the 1-2-3 release 5.0 for Windows program window consists of a *control panel* (title bar, menu bar, and edit line) and a *SmartIcon bar*. At the bottom of the program window is the *status bar*, where you get information about the current selection and where you can set text and numeric formatting. A new file consists of a single worksheet; you can add up to 255 worksheets by clicking the *New Sheet* button. A *range* is a rectangular group of one or more cells, one or more sheets deep. You can right-click a selected range, chart, or drawn object to display a *QuickMenu* of pertinent commands.

Note: Keys to press are highlighted in **boldface**. A bullet (•) links menu, button, option, check box, and drop-down list box names in a series.

ENTERING AND EDITING CELL DATA

A cell entry is a *label* (text) or a *value* (a number or formula). Values must begin with a number or one of the following symbols: +, = , –, @, $, (, #, or decimal point. To begin a label with one of these characters, type an alignment character first. To begin a formula with a cell address, range name, or worksheet file reference, type + first. As you type an entry, it appears in the cell and in the edit line's *contents box* (the line's larger gray box). To put the entry into the active cell, press **<Enter>**, click the edit line's ☑, or select another cell.

Align label left/center/right	Begin with '/^/"
Fill cell with repeating label	Begin with \
Enter relative cell address	Type it or select cell

Fold Here

Make cell address absolute	**<F4>** until variation reached
Select @function	**@<F3>**; or @, List All. Optionally select **C**ategory. Double-click function; or select function, OK
Edit active cell (activate Edit mode)	**<F2>** or double-click cell or click inactive contents box
In Edit mode, erase selected characters	**<Delete>** or **<Backspace>**. **<Esc>** for entire line. **<Ctrl>-<Backspace>** for word left
In Edit mode, convert cell's formula to its current result	**<F9>**
Use existing range name in formula	Type name; or , select name, OK
Exit Edit mode (lose changes)	**<Esc><Esc>** or **<Ctrl>-<Break>** or ☒

WORKING WITH RANGES

Select range smaller than entire row or column	Select corner. Hold **<Shift>**, select opposite corner; or drag to opposite corner
Select row/column	Click frame's row number/column letter
Select contiguous rows/columns	Select first row/column. Hold **<Shift>**, select last row/column; or drag to last row/column
Select collection of ranges	Select range, hold **<Ctrl>**, select next ranges
Select all cells in worksheet	Click upper-left corner of frame
Select range in consecutive worksheets (3-D range)	Select range in first/last worksheet; hold **<Shift>**, click tab of last/first worksheet
Deselect range	**<Esc>** or click worksheet
Cut selected range to Clipboard	or **<Shift>-<Delete>** or **<Ctrl>-X** or **E**dit • **C**ut

WORKING WITH RANGES (continued)

Copy selected range to Clipboard	or **<Ctrl>-<Insert>** or **<Ctrl>-C** or **E**dit • **C**opy
Paste from Clipboard	or **<Shift>-<Insert>** or **<Ctrl>-V** or **E**dit • **P**aste
Move selected range within single worksheet or between two open worksheets	Drag edge of range or cut and paste
Copy selected range to new location in same worksheet	Hold **<Ctrl>**, drag edge of range; or copy and paste
Erase selected range(s)	**<Delete>** or **E**dit • **C**lear
Insert/delete range smaller than entire column (cells selected/below move down/up)	Select range; **<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • **I**nsert/**D**elete, **I**nsert selection/**D**elete selection • OK
Insert/delete range smaller than entire row (cells selected/to right move right/left)	Select range; **<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • **I**nsert/**D**elete, **C**olumn • **I**nsert selection/**D**elete selection • OK
Insert/delete selected row(s)/column(s)	**<Ctrl>-<Gray Plus>**/**<Ctrl>-<Gray Minus>** or **E**dit • **I**nsert/**D**elete
Name range	**R**ange • **N**ame, type name, OK
Name range(s) using label(s)	Select label(s), **R**ange • **N**ame • **U**se Labels, select from **F**or cells list, OK or Close
Delete range name	**R**ange • **N**ame, select name, **D**elete, OK
Wrap text in selected cell(s)	**S**tyle • **A**lignment • **W**rap text, OK
Set height of row or selected rows	**S**tyle • **R**ow Height or drag bottom row border in frame
Set width of column or selected columns	**S**tyle • **C**olumn Width or drag column border in frame
Set width of selected column(s) to widest entry	Double-click right column border in frame
Hide column(s)/worksheet(s)	Select cell in column(s)/worksheet(s), **S**tyle • **H**ide • **C**olumn/**S**heet • OK
Format selected values	**S**tyle • **N**umber Format, select format, OK
Change selected range's font/font size	**S**tyle • **F**ont & Attributes, select from **F**ace/**S**ize list, OK
Copy selected range's format to another range	, select new range, **<Esc>** (to turn off); or **E**dit • **C**opy, select new range, **E**dit • Paste **S**pecial • **S**tyles only
Protect/unprotect selected range's format	**S**tyle • **P**rotection • **K**eep data unprotected after file is sealed • OK, protect file
Show/don't show selected range's negative values in red	**S**tyle • **L**ines & Color • Negative values in red • OK
Place/remove border around selected range/all range's cells	**S**tyle • **L**ines & Color • **O**utline/**A**ll • OK
Set horizontal alignment of selected entries	/ / or **S**tyle • **A**lignment • **L**eft/**C**enter/**R**ight • OK

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1-2-3 RELEASE 5.0 FOR WINDOWS

WORKING WITH RANGES (continued)

Set vertical alignment of selected entries	**S**tyle • **A**lignment • **T**op/Ce**n**ter/**B**ottom • OK
Map selected range's data	**T**ools • **M**ap • **N**ew Map, select map type, OK, click worksheet
Chart selected range's data	or **T**ools • **C**hart, drag over range to size
Create text block	, drag over range to size, type text

WORKING WITH WORKSHEETS

Turn undo on/off	**T**ools • **U**ser Setup • **U**ndo • OK
Undo last change if undo is on	or **<Alt>-<Backspace>** or **<Ctrl>-Z** or **E**dit • **U**ndo
Rename worksheet	Double-click tab, type name, **<Enter>**
Go to intersection of last row and last column with entries	**<End><Home>**
Go to first nonempty cell before or after empty cell	**<End>, <Up>/<Down>/<Left>/<Right>**
Go to cell, named range, chart, drawn object, or query table	**<F5>**, select from **T**ype of item list, OK

Fold Here

Insert worksheet after current worksheet	New Sheet
Insert worksheet(s) before/after current worksheet	**E**dit • **I**nsert or **<Ctrl>-<Gray Plus>**; **S**heet, **B**efore/**A**fter, set **Q**uantity, OK
Go to worksheet	Click worksheet tab; or **<F5>**, type name and colon, OK
Go to next/previous worksheet	**<Ctrl>-<Page Up>/<Ctrl>-<Page Down>**
Move right/left one screen width	**<Ctrl>-<Right>/<Ctrl>-<Left>**
Go to cell A1/A:A1	**<Home>/<Ctrl>-<Home>**
Magnify/shrink worksheet 10%	**V**iew • **Z**oom In/Zoom **O**ut
Return to default display size	**V**iew • **C**ustom
Split worksheet beneath/to right of active cell	Drag Split bar or **V**iew • **S**plit • **H**orizontal/**V**ertical • OK
Unsplit worksheet	**V**iew • Clear **S**plit
Turn off/on worksheet grid lines	**V**iew • Set View **P**references • **G**rid Lines
Turn on/off AutoSave	**T**ools • **U**ser Setup • **S**ave file every, specify interval, OK
Print worksheet sideways	**F**ile • **P**age Setup • **L**andscape
Cascade 3 worksheets	**V**iew • **S**plit • **P**erspective • OK
Move between panes or views	**<F6>**
Group/ungroup worksheets	**S**tyle • **W**orksheet Defaults • **G**roup Mode
Set default label alignment, column width, font, font size, text color, number of decimals	**S**tyle • **W**orksheet Defaults, set defaults, OK

WORKING WITH FILES

Create new file with blank worksheet	**F**ile • **N**ew • **C**reate a plain worksheet • OK
Create new file using template	**F**ile • **N**ew, select template, OK
Open existing file	or **<Ctrl>-O** or **F**ile • **O**pen
Save open file	or **<Ctrl>-S** or **F**ile • **S**ave
Create file profile	**F**ile • **D**oc Info, type information, OK
Change default file directory	**T**ools • **U**ser Setup • **W**orksheet directory, type directory path, OK
Close file	**<Ctrl>-<F4>** or **F**ile • **C**lose or double-click file's Control box
Freeze title rows/columns/both above/left of selected range	**V**iew • Freeze **T**itles • **R**ows/**C**olumns/**B**oth
Unfreeze titles	**V**iew • Clear **T**itles
Print file or range	or **<Ctrl>-P** or **F**ile • **P**rint • OK
Preview printout of selected range	or **F**ile • Print Preview • OK
Fit print range to single page	**F**ile • **P**age Setup • **S**ize • Fit all to page

Fold Here

Move to next/previous open file window	Hold down **<Ctrl>-<End>**, **<Ctrl>-<Page Up>/<Ctrl>-<Page Down>**; or **<Ctrl>-<F6>/<Ctrl>-<Shift>-<F6>**
Protect/unprotect file	**F**ile • **P**rotect • **S**eal File • OK
Merge file into current worksheet	**F**ile • **O**pen, select file, **C**ombine

WORKING WITH MACROS

Record macro	**T**ools • **M**acro • Re**c**ord
Display transcript window	**T**ools • **M**acro • Show Tra**n**script
Play back transcript macro selection in transcript window	Tra**n**script • **P**layback
Name macro	Select macro range, **R**ange • **N**ame
Create macro button	or **T**ools • **D**raw • **B**utton
Run macro	**<Alt>-<F3>**, select name or range
Activate macro single-step mode	**T**ools • **M**acro • **S**ingle Step
Activate macro trace	**T**ools • **M**acro • **T**race

Note: You can run a macro whose name begins with \ (backslash) followed by a single letter by holding **<Ctrl>** and pressing the letter key.

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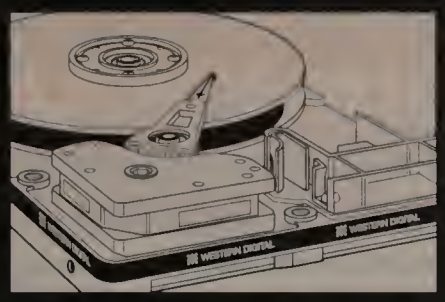
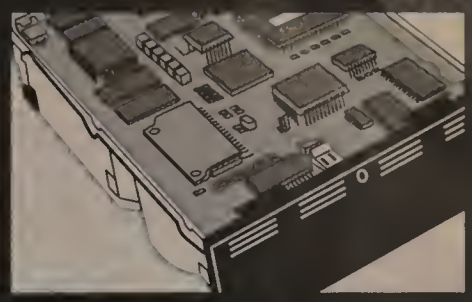
MEGA HAUS HARD DRIVES

The Drive Authority!





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Nobody knows drives like MegaHaus. We have specialized in storage solutions for over 8 years. Repeat business from satisfied customers is the backbone of our business. We satisfy our customers.

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During the first year of your warranty, we replace: not repair, any defective items. All items receive lifetime technical support from our factory trained techs.

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Anyone can sell you a hard drive. We sell easy to install storage solutions. We spend countless hours researching the best solutions, then create our quick precise installation guides for each kit.

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The largest manufacturer of disk drives in the world!

			IDE	SCSI
365MB	11ms	LT365	$179	$189
420MB	12ms	TB420	$183	n/a
540MB	14ms	MV540	$217	$228
731MB	11ms	LT730	$252	$262

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Best buy large capacity SCSI drives!
5yr advanced replacement warranty.

2050MB	8.5ms	7200rpm	MC4221	$879
4294MB	8ms	7200rpm	MC3243	$1479
9100MB	12ms	5400rpm	MC1991	$2529

OPTICAL DRIVE SALE!

Price includes 1 FREE disk! Complete internal and external kits available for all computers.

Capacity	Brand	Speed	Buffer	Wty	Price
230MB	Fujitsu	30ms	256K	1yr	$695
1.3Gig	NEC	25ms	1MB	2yr	$1799
1.3Gig	Maxoptix	23ms	4MB	1yr	$2149

FUJITSU

JAPANESE QUALITY! INCREDIBLE PRICE!

530MB	3.5"	13.8ms	IDE	2yr wty.	$195
530MB	3.5"	13.8ms	SCSI	2yr wty.	$212

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Run on floppy controller. 1 FREE tape. Save $10 w/ drive sale.

Capacity	Brand	Warranty	Internal	External
250MB	IOMEGA	5yr	$139	$249
420MB	CONNER	2yr	$187	$339
850MB	CONNER	2yr	$282	$429

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External CD ROM changers. No more disc swapping!

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6 Disc	Quad Speed	DRM604X	$819
18 Disc	Quad Speed	DRM1804X	$1899

HARD DRIVES

CONNER

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850MB	10ms	CNR850A	$269
1275MB	9ms	CNR1275A	$409

SCSI

2147MB	8.5MS	CFP2105S	$899

IBM

WIDE SCSI

1052MB	8.6ms	0662S12W	$699

Maxtor

IDE

420MB	12ms	M7420AV	$179
540MB	12ms	M7540AV	$199
853MB	12ms	M7850AV	$254
1260MB	12ms	M71260AV	$385

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2050MB	8.5ms	MC4221	$879
4294MB	8ms	MC3243	$1479
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WIDE SCSI

2050MB	8.5ms	MC4221W	$999
4294MB	8ms	MC3243W	$1669
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2000MB	8.5ms	MC4221AV	$1059
4294MB	8ms	MC3243AV	$1629
9100MB	12ms	MC1991AV	$2729

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IDE

420MB	14ms	ST3491A	$179
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722MB	12ms	ST3780A	$245
850MB	12ms	ST5850A	$285
1083MB	12ms	ST31220A	$389

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1052MB	9ms	ST31230N	$519
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2147MB	8ms	ST32550N	$1049
4290MB	9ms	ST15230N	$1459
4290MB	8ms	ST15150N	$1699
9080MB	11ms	ST410800N	$3049

WE SELL HIGH QUALITY DISK ARRAYS AT AFFORDABLE PRICES!

HARD DRIVES

WESTERN DIGITAL

IDE

420MB	12ms	AC2420	$185
540MB	12ms	AC2540	$209
853MB	10ms	AC2850	$285
1083MB	10ms	AC31000	$399
1280MB	10ms	AC31200	$439

Quantum™

IDE

541MB	11ms	LT540A	$232

SCSI

540MB	11ms	LT540S	$242
1080MB	9ms	IMP1080S	$539
2160MB	9.5ms	IMP2160S	$889

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44/88MB	SQ5110C	$249	$369	$399
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200MB	SQ5200C	$369	$499	$519
270MB	SQ3270S	$369	$519	$489
IDE		Drive	PC Kit	Portable
105MB	SQ3105A	$179	$269	$339
270MB	SQ3270A	$339	$439	$529

Genuine Syquest Cartridges
Qty 2-4 / 5-9 / 10+ or with drive
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105MB $56/54/53 200MB $80/75/72
270MB $65/62/59

NOTEBOOK UPGRADES

2.5" Drives			SCSI	IDE
240MB	14ms	Fujitsu	$279	$279
256MB	17ms	Quantum	$269	$274
514MB	17ms	Quantum	$429	$439

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PCMCIA internal docking bay for desktop $119

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Drive Media! WIDE SCSI, Optical, Macintosh & Power PC Drives, Hard Disk Cards, PCMCIA, 2 1/2" Drives, Floppy Drives, IBM PS/1, PS/2, and Tandy Drives.

CD ROM DRIVES

SCSI

Toshiba	XM3501	4X	155ms	$299
NEC	CDR4X	4X	220ms	$279
Plextor	PX43CS	4X	170ms	$339
Sony	CDU55S	2X	250ms	$169
Sanyo	SH93R	2X	280ms	$149

IDE (ATAPI)

Mitsumi	CRMCFX400	4X	230ms	$209
Sony	CDU55A	2X	250ms	$139

MULTIMEDIA KITS

SCSI Drive, sound card (in retail pkg)
PREM=Media Vision Premium 3D. PRO=Media Vision Pro 3D
SB= Sound Blaster 16 SCSI. SA= Sound Blaster SCSI ASP.

	PREM	PRO	SB	SA
SH93R	$279	$409	$309	$339
CDR4X	$439	$579	$469	$509
XM3501	$469	$609	$499	$529

CD ROM TOWERS

Multiple drives in a single enclosure.

	2 Drive	4 Drive	7 Drive
Sony 2X	$419	$879	$1499
NEC 4X	$689	$1439	$2439
Toshiba 3501	$755	$1579	$2679

SCSI TAPE DRIVES

Kit includes 16bit card, DOS or Windows software & 1 tape.

			Bare	Kit
250MB	Conner	2150	$339	$489
525MB	Conner	2525	$479	$629
1Gig	WangTek	51000	$529	$679
2Gig	WangDat	3100	$679	$799
2Gig	HP	35470	$759	$879
2Gig	Conner	4320	$779	$899
4Gig	Conner	TSM4000	$539	$609
4-8Gig	WangDat	3200	$819	$939
4-8Gig	Conner	4324	$849	$969
4-8Gig	HP	35480	$869	$989
4-10Gig	WangDat	3400	$919	$1039
4-10Gig	Conner	4326	$959	$1079
4-10Gig	HP	C1533A	$1049	$1169

Backup Software
Novell NLM 50 user / unlimited / OS/2 $199 / $339
NovaStor OS/2 / Macintosh $89 / $99
TAPEDISK use our SCSI tapes as a regular drive $229

CONTROLLER CARDS

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A1522COREL 16Bit SCSI	$129	$109
A1542COREL 16Bit SCSI	$235	$225
A2742 EISA SCSI	$379	$369
A2842 VESA SCSI	$259	$249
A2940Kit PCI SCSI	$299	$289
Future Domain 1680 16Bit SCSI	$134	$119
QLOGIC PCI SCSI & WIDE	$325	$315
TEKRAM CACHING CARDS		
DC600CF 16Bit IDE	$89	$79
DC680C 32Bit Local Bus IDE	$109	$99
DC690C 32Bit PCI IDE	$149	$139
SCSI Controllers include COREL SCSI		
DC800B 16Bit SCSI	$199	$189
DC880B 32Bit Local Bus SCSI	$299	$289
TEKRAM NON-CACHING		
DC300B 16Bit SCSI w/ Corel	$159	$149
DC380B VESA SCSI w/ Corel	$179	$160
DC290N PCI Enhanced IDE	$45	$39
DC200S 16Bit IDE w/ High Speed IO	$55	$45
GSI 16Bit IDE accelerators (enhanced IDE)		
Boost Performance 30 to 80%! VESA coming soon.		
1533-21 2IDE, 4 Floppy	$59	$49
1533-32 2IDE, 4 Floppy, IO	$125	$115
4C 16Bit supports 8 IDE	$139	$129

Many other types of controllers in stock.

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The Satellite Pro™ T2150CD Series delivers built-in CD-ROM functionality, optimal multimedia capability, affordable mass storage, and quick data retrieval.

✔ IntelDX4™ 75MHz CPU ✔ 4MB RAM std., 28MB max. (T2150CDS) or 8MB RAM std., 32MB max. (T2150CDT) ✔ Displays: 10.4" dual-scan color (T2150CDS) or 10.4" active-matrix color (T2150CDT) ✔ Local bus video with graphics accelerator ✔ 1MB video RAM ✔ Integrated double-speed CD-ROM ✔ Sound Blaster Pro™ compatible with MIDI and .WAV support ✔ PCMCIA: two Type II or one Type III ✔ Ports: serial, parallel, external monitor, external disk drive, PS/2 keyboard ✔ Optional port replicator for convenient desktop use ✔ Built-in microphone, headphone, and line-in jacks ✔ AccuPoint™ integrated pointing device ✔ NiMH battery, 2.5 hours life, MaxTime® power management ✔ Pre-loaded MS-DOS®, Windows® for Workgroups and more ✔ Three year warranty

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T2150CDT 500MB ..... **$4696.22** CDW 51894

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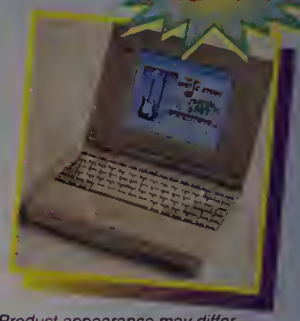
Satellite T2100 Series

Power made affordable



Product appearance may differ

Toshiba's Satellite® T2100 Series notebook computers pack high-performance, expandability and portability into a sleek and lightweight design.

◆ IntelDX2™ 50MHz CPU ◆ 4MB RAM std. 28MB max. (T2100, T2100CS) or 8MB RAM std. 32MB max(T2100CT) ◆ Choice of displays: 10.4" dual-scan color (T2100CS), 8.4" active matrix color (T2100CT) or 9.5" dual-scan mono (T2100) ◆ Local bus video ◆ 1MB video RAM (T2100CS, T2100CT) ◆ PCMCIA: two Type II or one Type III ◆ Ports: serial, parallel, external monitor, PS/2 keyboard ◆ Optional port replicator for convenient desktop use ◆ Full-size 82-key keyboard with AccuPoint integrated pointing device ◆ NiMH rechargeable battery pack, 2.5+ hours life, MaxTime® power management ◆ Built-in power supply, no external A/C adapter required ◆ Pre-loaded MS-DOS® and Windows® ◆ Weighs less than 7lbs ◆ One year U.S. and international warranty

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T2100 250MB ..... **$1449.02** CDW 50879

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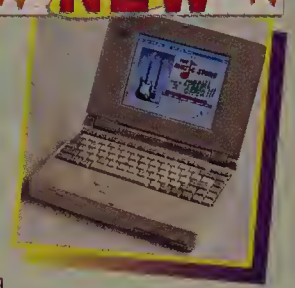
75MHz power in the office and on the road



◆ IntelDX4™ 75MHz CPU (3.3 volt and SL-enhanced) ◆ Integrated floating point math coprocessor, 16KB CPU cache ◆ 8MB RAM std., 32MB max. ◆ 9.5" TFT active matrix color display ◆ Supports simultaneous external VGA monitor, 1024 x 768 maximum resolution ◆ 2 PCMCIA slots: 5mm Type II and 14.5mm Type III and larger ◆ Ports: serial, parallel, SCSI-2, PS/ 2 mouse/keyboard, expansion bus, external monitor ◆ NiMH battery pack, 2+ hours life ◆ Pre-loaded MS-DOS®, Windows™ for Workgroups, Adaptec EZ-SCSI for Toshiba ◆ Three year warranty

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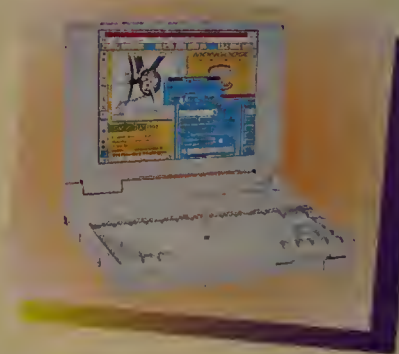
Mobile Pentium T4900CT

Maximum performance color notebook

Pentium™ power with an explosion of multimedia!



✔ 75MHz Intel Pentium™ CPU (3.3 volt and SL-enhanced) ✔ Integrated floating point math coprocessor, 16KB CPU cache ✔ 8MB high speed RAM std., 40MB max. ✔ High-perfromance 772MB hard drive ✔ Large active matrix color display: 10.4" diagonal ✔ Local bus video with graphics accelerator: 64K colors at 640 x480 ✔ Supports simultaneous display on external monitor ✔ 16-bit .WAV and MIDI sound capability: built-in microphone and speaker ✔ 2 PCMCIA slots: 5mm Type II and 10.5mm ✔ AccuPoint keyboard-integrated pointing device, QuickRead status icons ✔ Ports: serial, parallel, PS/ 2 mouse, PS/2 keyboard, expansion bus, external monitor, headphone/speaker, and microphone ✔ NiMH battery pack, 2+ hours life, Maxtime Power System ✔ Pre-loaded MS-DOS®, Windows for Workgroups, Windows Sound System ✔ Three year warranty

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- ✔ Removable hard drive, battery and floppy drive
- ✔ PCMCIA: accepts 2) Type II or 1) Type III
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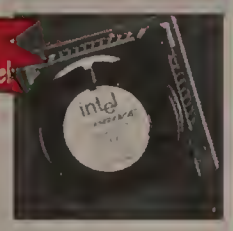

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ML520	369.82	OL830 Plus	1076.51
ML521	495.18	OL850	1189.60
ML590	429.51		

Canon

BJ10SX	244.88	BJ230	388.00
BJ200E	229.86	BJC600e color	465.18
BJC600e color	465.18		
BJC4000 720dpi + color	359.78		

EPSON

AP2250	96.64	DFX5000 Plus	1384.01
AP3250	146.45	DFX8000	2322.45
AP3260	167.82	Stylus 300	183.16
LX300	165.65	Stylus 400	194.89
FX870	288.45	Stylus 800+	211.14
FX1170	366.33	Stylus 1000	436.15
AP5000+	229.71	Stylus Color	509.53
LQ1070+	375.26	ActionLaser 1100	383.62
LQ870	454.44	ActionLaser 1400	598.36
LQ1170	623.51	ActionLaser 1500	458.82
LQ2550	965.08	ActionLaser 1600	765.75

IBM LEXMARK LASER PRINTERS

WinWriter 100 inkjet	287.96
WinWriter 200 laser	453.61
WinWriter 400 laser	755.03
WinWriter 600 laser	999.00
ValueWriter 300 (4037 5E 5PPM)	644.87
ValueWriter 600 laser	815.87
Optra R 600dpi laser	1426.89
ExecJet IIc	319.83

Digital Corporation

DECwriter 500i inkjet	262.47
Color upgrade for 500i	44.29
DEClaser 1152 4 ppm	628.78
DEClaser 5100 8 ppm	1227.98

Panasonic

1150	133.49
1624	385.20
2023	182.27
2130	204.40
2135 Color	247.43
KXP2624	409.49
3123	249.00
4400 Laser	454.90
5400 Laser	495.53

Texas Instruments

microMarc Color inkjet	334.76
microWriter PS23	639.65
microLaser Pro 600 PS23	1197.02
microLaser Pro E	1395.49
microLaser Power Pro 600 PS65	1629.60

Hewlett Packard

OfficeJet inkjet fax/copier/printer	779.59
DeskJet 540	289.75
DESKJET 560C	479.89
DESKJET 1200C	999.88
DESKJET 1200C PS	1599.49
LaserJet 5P	CALL
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LaserJet 4 plus	1449.96
LASERJET 4SI	2998.95
LaserJet 4V	1967.38
LaserJet Color	5929.62

COSTAR

LabelWriter XL DOS/Win	139.86
LabelWriter XL Plus DOS/Win	224.89

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345MB SCSI-2	189.88
420MB Fast-ATA	199.87
540MB Fast-ATA	232.84

MICROPOLIS

2217 1.7GB SCSI-2	1038.46
4221 2.1GB SCSI-2	1099.98
3243 4.3GB SCSI-2	1759.26
1936 3GB SCSI-2	1299.87

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540MB IDE	249.80
850MB Fast-ATA	317.86
1.27GB Fast-ATA	517.97

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Seagate

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545MB Fast-ATA	224.08
722MB Fast-ATA2	265.46
1GB Fast-ATA2	454.52
1.0GB SCSI-2	584.36

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Caviar 420MB EIDE	195.19
Caviar 540MB EIDE	256.90
Caviar 730MB EIDE	279.08
Caviar 1GB EIDE	437.47

CONTROLLERS

Acculogic SIDE-3+ w/on-board BIOS	48.90
Acculogic SIDE-4+ w/par, 2ser, game	35.06
Acculogic SIDE-4VL EIDE, 16550 serial	89.76
Acculogic ISApport SCSI-2	121.60
Adaptec AVA1505 SCSI-2 CD Kit	54.95
Adaptec AHA1542CF SCSI-2	265.45
Adaptec AVA2825 VLB SCSI-2/EIDE	166.87
Adaptec 2842 VLB SCSI-2	249.83
Promise 2300+ EIDE VLB	59.87

MODEMS & COMMUNICATIONS

U.S. Robotics

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V.34 28.8K external w/fax	242.06
14.4K internal w/fax	94.81
14.4K external w/fax	111.00

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V.34 external w/fax	422.32

Hayes

ACCURA 144 internal w/fax	93.99
ACCURA 144 external w/fax	111.18
ACCURA 288 V.34 internal w/fax	188.13
ACCURA 288 V.34 external w/fax	218.88
OPTIMA 144 external w/fax	374.30
OPTIMA 144 pocket w/fax	296.93
OPTIMA 288 V.34 internal w/fax	365.14
OPTIMA 288 V.34 external w/fax	421.54

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14.4 Mini Tower w/fax	109.02
V.34 28.8 internal w/fax	196.59
V.34 28.8 Mini Tower w/fax	209.64

BOCA

Online Express 14.4 internal w/fax	64.25
Online Express 14.4 external w/fax	79.78
V.34 28.8 internal w/fax	164.44
V.34 28.8 external w/fax	209.90

MICROCOM

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Deskporte Fast ES V FC 28.8	179.94
Deskporte Fast EP V.FC 28.8	244.30

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BackUPS 400	144.28
BackUPS 450	175.81
BackUPS 600	243.00
BackUPS 900	345.76
BackUPS 1250	449.29
SmartUPS 400	299.69
SmartUPS 600	363.38
SmartUPS 900	514.61
SmartUPS 1250	644.24
SurgeArrest Network	33.25
SurgeArrest Pro	29.45
SurgeArrest Network + Phone	49.98
Line-R 600	119.09

Tripp Lite

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BC400	138.91
BC500	173.09
BC500 LAN	177.51
BC600 LAN	231.43
BC750 LAN	289.03
BC900 LAN	327.59
BC1250 LAN	426.10

Tripp Lite Smart UPS Series

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SMART 500 LAN	279.44
SMART 600 LAN	289.16
SMART 750 LAN	348.82
SMART 900 LAN	422.58
SMART 1250 LAN	555.73
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Isobar 6 OUTLET	46.38

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Hayes EZJack V.34 w/fax	299.87
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Linksys Ethernet combo	165.74
Megahertz 14.4K data/fax	179.48
Megahertz XJack 14.4 data/fax	179.55
Megahertz XJack Gold 14.4 data/fax	198.89
Megahertz V.34 XJack data/fax	353.09
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New Media Wave Jammer sound card	235.96
New Media Multimedia Combo	439.80
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Simple Tech 14.4K modem + voice	149.84
Simple Tech SCSI adapter	145.51
Simple Tech 130MB hard drive	368.36
Simple Tech 170MB hard drive	409.65
Adaptec APA1460 SCSI-2	247.94
Turtle Beach Audio Advantage	129.38
USR Sportster 14.4K	184.80
USR Sportster V.34	355.78
Xircom Ethernet 10BT	177.54
Xircom Ethernet combo	237.99
Xircom Ethernet+modem 10BT	449.82
Xircom Ethernet+modem combo	487.57

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Intel OverDrive DX2/50	125.68
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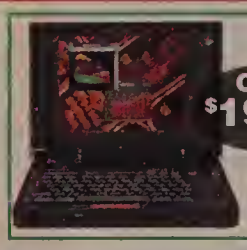

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T2400CT 250/320MB ..... $2894/$3057
T2450CT 320/500 MB ..... $3974/$4247
T3400CT 120/250MB ..... $2067/$2247
T3600CT 250MB $3447
T4700CT 200/320MB ..... $2897/$3117
T4800CT 500MB $4237
T4850CT 500/810MB ..... $4574/$4874
T4900CT Pentium 810MB $6377
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755C Color Active 170MB 340/540MB ..... $4449 / $4849/$5199
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TM4000 M DX4/75 Dual Scan 340MB $2794
TM4000 M DX4/75 Active Color 340MB $3047
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ACCURA 144+FAX144 in/ext ..... $92/$112
ACCURA 288V.FC+FAX int/ext ..... $185/$219
DPTIMA 144+FAX144 int/ext ..... $369/$369
DPTIMA 288 V.FC+FAX int/ext ..... $379/$43
ESP Communications Accelerator $75

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Sportster 14.4 Fax int/ext ..... $95/$109
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Sportster V.34 int/ext ..... $219/$239
Sportster V.34 PCMCIA $349
Courier Dual Standard 14.4 PCMCIA $349
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V.34 28,800 Data Fax Modem int/ext ..... $169/$189

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PCMCIA Gold Series X JACK 14.4/14.4 ..... $199
PCMCIA Gold Series 14.4/14.4 $199
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Ethernet/Modem Combo 10Base T/14.4 ..... $419

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Sound Expression 14.4/16bit Sound $159
14.4 Pocket w/FAX $155
V.34 28,800 bps Modem int./ext. ..... $169/$209

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Wave Jammer 16-bit Stereo Sound $234
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MultiSpin 3Xp $379
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XM3501 Int Quad Speed $298
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16 bit I/F for XM3501 Ext 4x $157

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Back Pack Portable 2X $324
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TEAC

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17" MultiSync XP17 ..... $1197
21" MultiSync XP21 ..... $2357

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Graphite 64 1MB VLB/PCI $135
Graphite 64 2MB VLB/PCI $175
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Graphics Xpression 2MB PCI $219
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Graphics Pro Turbo 2MB ISA/VLB/PCI $379
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ACTION Laser 1500/1600 ..... $454/$754
LX300 ..... $164
LD-570+/1070+ ..... $244/$374
FX-870/1170 ..... $287/$374
LD-300/870/1170 ..... $196/$457/$614
LQ-2550 Clr. $967
DFX-5000+/8000 ..... $1367/$2324
Stylus 800+/1000 ..... $219/$427
Stylus Color $499

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KX-P4440 ..... $989
KX-SP100 Printer/Fax/Copier $764
KX-P1150/P2023 ..... $129/$155
KX-P3123/P3124 ..... $249/$319
KX-P2130/P2135 ..... $169*/$195*
KX-P3696/P3626 ..... $399/$389

*Price includes Manufacturer Rebate

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DECColorwriter 520ix $339
DECloser 5100 ..... $1149
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Model 100/200 ..... $254/$455
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ValueWriter 300/600 ..... $645/$814
ExecJet IIc $317
2380/2381 Plus Dot Matrix ..... $327/$439
2390/2391 Plus Dot Matrix ..... $347/$439
4226 Dot Matrix $1299
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OKIDATA PRINTERS

OL400E/OL410E ..... $399/$544
ML320-I/ML321-I ..... $299/$429
ML590-I/ML591-I ..... $424/$584

HP PRINTERS

HP DeskJet 320/540 ..... $298/$284
HP DeskJet 540 Opt. Color kit $39
HP DeskJet 560C $469
HP DeskJet 1200C/C PS ..... $997/$1587
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HP LaserJet 4L/4P ..... $499/$949
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CANON

BJ-100 /BJ-10SX ..... $197/$237
BJ-200e/200ex/230 ..... $224/$237/$384
BJC-4000/BJC-600e ..... $354/$458
LBP-430/ LBP-1260 ..... $577/$1267

TEXAS INSTRUMENTS

microLaser 600 ..... $854
microLaser Pro 600 PS23 ..... $1167
microLaser Pro E/ Power Pro ..... $1347/$1597
microWriter Printer $464
microWriter PS23/PS65 ..... $614/$824

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Reli 9612 ..... $1499
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Reli Handheld MorphingScan $178
Reli HandScan 24 w/CorelDraw 4 ..... $238
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EPSON

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ST31230N	1.00GB	10MS	SCSI-2	525
ST11900N	1.7GB	9MS	SCSI-2	999
ST12400N	2.1GB	9MS	SCSI-2	949
ST32430N	2.1GB	10MS	SCSI-2	949
ST43400N	3.5GB	11MS	SCSI-2	1850
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M7540AV	540MB	12MS	IDE	211
M7850AV	853MB	12MS	IDE	253
M71260AV	1.2GB	12MS	IDE	389
M7345S	345MB	14MS	SCSI	205
MXT540A	540MB	8.5MS	SCSI	345
MXT540S	540MB	8.5MS	SCSI	345
DR3410	105MB	MBL MAX	PCMCIA	360
MobileMax131	131MB	19MS	PCMCIA	375
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CFA540A	540MB	12MS	IDE	209
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CFP1060S	1.06GB	9MS	SCSI-2	509
CFP2105S	2.1GB	9MS	SCSI-2	889
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MC2217	1.75GB	10MS	SCSI-2	875
MC4221	2.05GB	8.5MS	SCSI-2	969
MC1936	3.0GB	11MS	SCSI-2	1399
MC3243	4.3GB	8MS	SCSI-2	1569
MC1991	9.0GB	11MS	SCSI-2	2869
MC4221AV	2.05GB	8.5MS	SCSI-AV	1069
MC1936AV	3.0GB	11MS	SCSI-AV	1545
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LT540S	540MB	14MS	SCSI-2	243
MV540S	540MB	14MS	SCSI-2	228
LT541S	541MB	11MS	SCSI-2	243
LT730S	731MB	11MS	SCSI-2	263
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IBM

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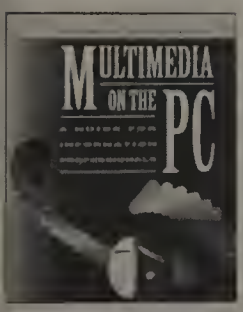

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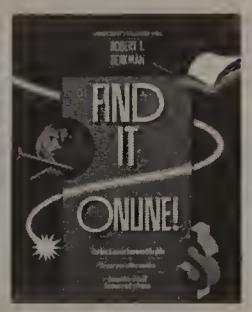

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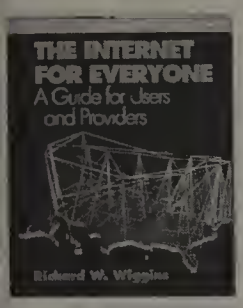

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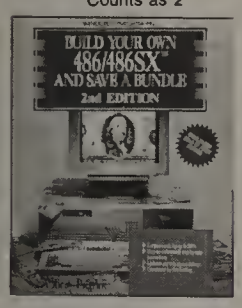

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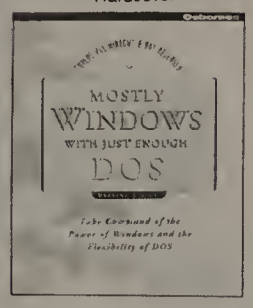

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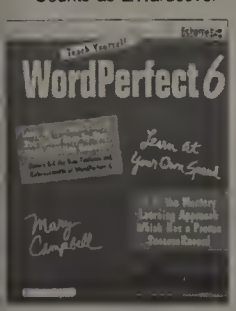

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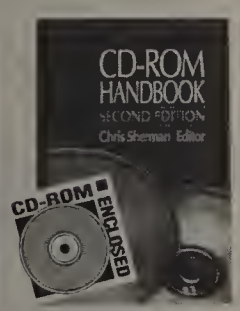

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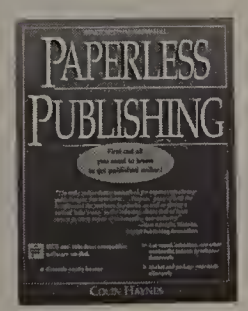

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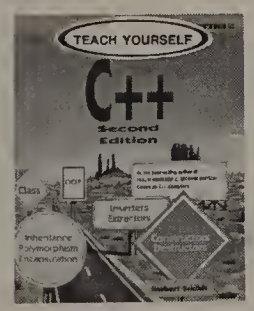

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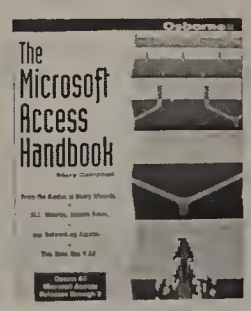

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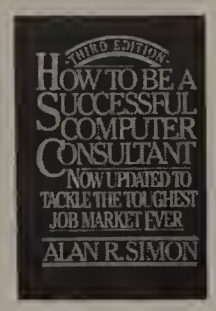

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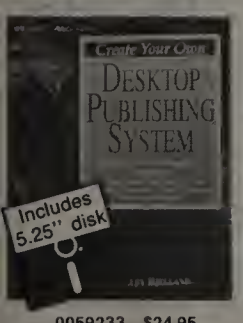

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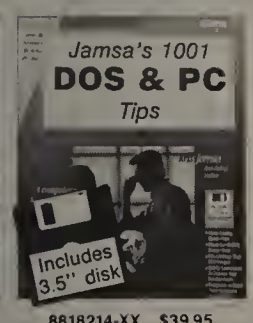

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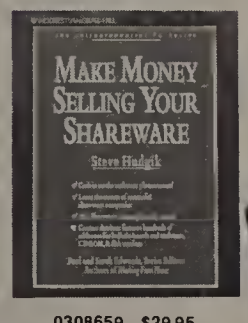

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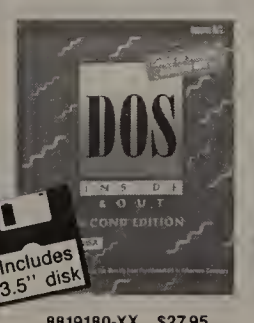

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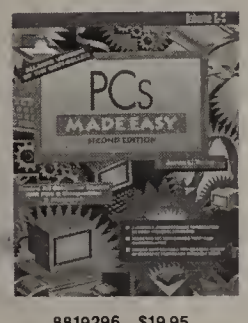

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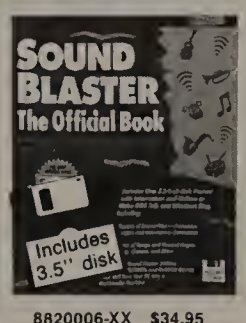

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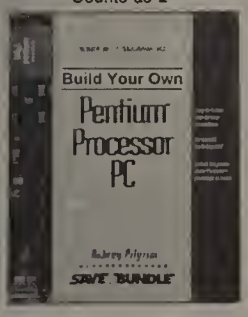

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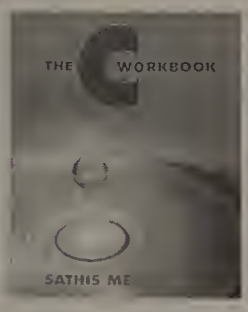

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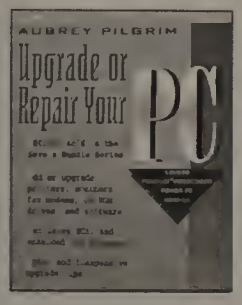

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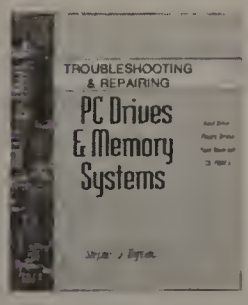

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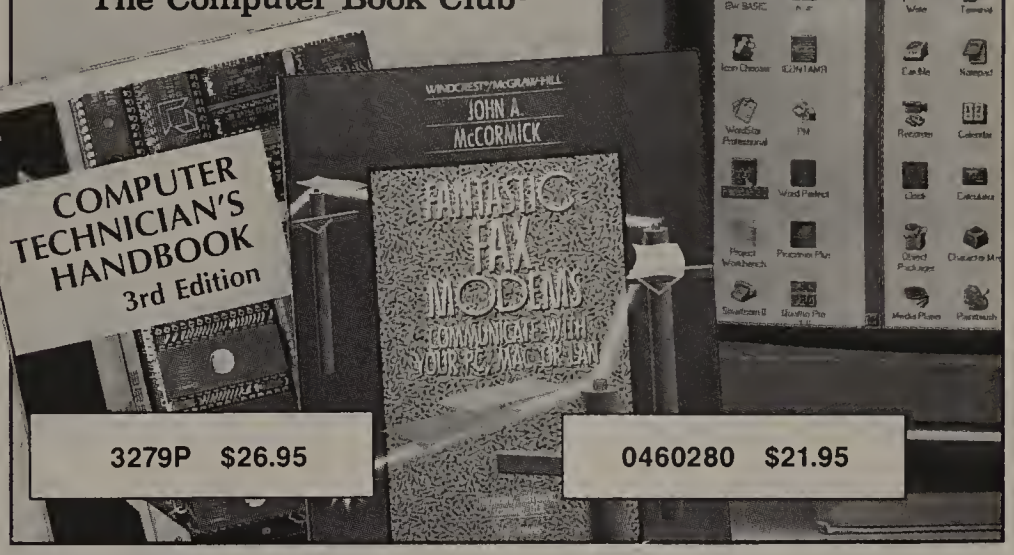

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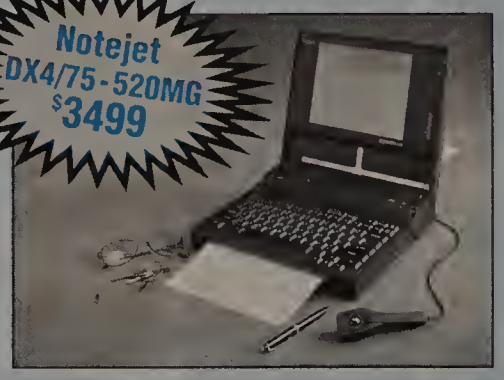

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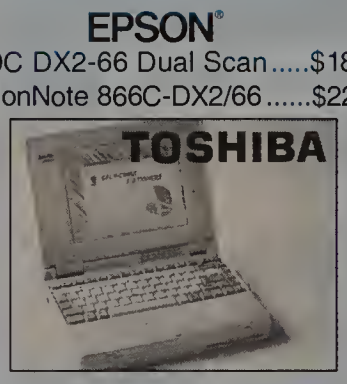

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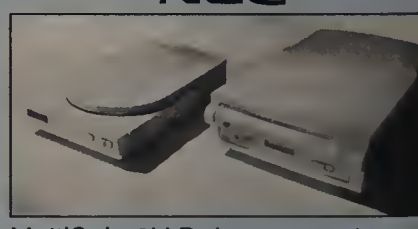

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78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	175.00
67F9977/92G7199 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	175.00
1057035 (512K)	P/S1-286	49.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	109.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	189.00
92G7200 (4Meg)	PSI Expert, Consultant, Willow	175.00
92G7201, 73G3131 (4Meg)	Value Point Performance, PC Server 4/66	175.00
73G3132/92G7203 (8Meg)	Value Point Performance, PC Server 4/66	339.00
60G1622/92G7204 (16Meg)	Value Point Performance, PC Server 4/66	609.00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1239.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	90.00
6450128/92G7200 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Mod-2123, 2133, 2155, Val Pt 77, 486CS2, 486SX, SVR85 Value Point 77 486DX2, 486SX, SVR 85	175.00
6450129/92G7428 (8Meg)	35SX, 40SX	339.00
6450130/92G7202 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	339.00
6451158/92G7208 (4Meg ecc)	486; 95XP; 95A (install in pairs)	199.00
6451159 (8Meg ecc)	486; 95XP; 95A (install in pairs)	399.00
92G7209/32G3720 (16Meg ecc)	9595 OPT	749.00

IBM NOTEBOOK & LAPTOP MEMORY

07G1415/07G1420 (4Meg)	Thinkpad 750, C, 700, C, 720, C, CL575X	189.00
07G1416/07G1421 (8Meg)	Thinkpad 750, C, 700, C, 720, C, CL575X	369.00
66G0095 (16Meg)	Thinkpad 750, C	669.00
66G0094 (4Meg)	Thinkpad 755, 360, 355, 340, 450	179.00
66G0094 (8Meg)	Thinkpad 755, 360, 355, 340, 450	349.00
66G0094 (16Meg)	Thinkpad 755, 360, 355, 340, 450	629.00
8189098 (4Meg)	Thinkpad 500, 510CS (3.3 volt)	209.00
8189099 (8Meg)	Thinkpad 500, 510CS (3.3 volt)	389.00
8189113 (16Meg)	Thinkpad 510CS (3.3 volt)	799.00
79F0999 (2Meg)	LX40, N33SX, PS Note	103.00
79F1000 (4Meg)	LX40, N33SX, PS Note, Tkpd 350, 350c, PS Note 425	189.00
79F1001 (8Meg)	LX40, N33SX, PS Note	349.00
Hard Drive (524Meg, 710 Meg))	Thinkpad 750, 755, 360, 355	949.00/1149.00
(4Meg/16Meg)	Thinkpad 755 Dimm Modules	209.00/699.00
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60G0378 (8Meg)	Thinkpad 350, 350c, PS Note 425	339.00
60G0379 (16Meg)	Thinkpad 350, 350c, PS Note 425	569.00
92F8804 (2Meg)	N45SL	109.00

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DeskPro 386/33, 386/33L,	2Meg Module	115144-001	109.00
486/25, 486/33L,	8Meg Module	116561-001	399.00
486/50L, System Pro	32Meg Module	116568-001	1399.00
DeskPro 386/33L, 486/33L	(Exp 8d)	116569-001	279.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	199.00
DeskPro 386S-16MHz	1Meg Exp 8d	113633-001	149.00
	4Meg Exp 8d	113634-001	279.00
	1Meg Module	113646-001	79.00
	4Meg Module	112534-001	199.00
DeskPro 386/20E	1Meg Exp Bd	113644-001	149.00
DeskPro 386/25E	4Meg Exp 8d	113645-001	279.00
	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	199.00
DeskPro 286N, 386N, 386SX20,	1Meg Module	118688-001	59.00
all "M" series, sytem LT series,	2Meg Module	118689-001	89.00
all "I" series	4Meg Module	118690-001	169.00
	8Meg Module	128877-001	339.00
M Series Exp 8d	0-64Meg	129160-001	189.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	299.00
	1-2Meg Exp 8d	108069-001	239.00
	4-8Meg Exp 8d	108070-001	437.00
DeskPro 286	512K Kit	113012-001	49.00
DeskPro 5/60, 5/66M, 5/66M (ALL OF THESE MACHINES USE THESE MODULES)	8Meg Kit	149911-001	389.00
Prosignia 5/60	16Meg Kit	149949-001	699.00
Proliant 100 5/60	32Meg Kit	149912-001	1356.00
Proliant 2000 4/30, 5/66	64Meg Kit	149913-001	2516.00
Proliant 4000 4/50, 5/66	128Meg Kit	149914-001	5799.00
Prolinea 386 3/25S, 3/25ZS	2Meg	141738-001	90.00
	8Meg	141742-001	316.00
Prolinea 486 4/25S, 4/33, 4/50, 4/66, COS	2Meg	141683-001	95.00
Enhanced Prolinea, Prosario series	4Meg	141684-001	175.00
	8Meg	141685-001	339.00
Prosignia PC Server, 486/33,	8Meg	141685-001	339.00
486 DX2/66	16Meg	149320-001	599.00
	32Meg	149147-001	1199.00

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LTE/286	4Meg 8d	117081-003	179.00
LTE/386S/20	4Meg Module	121125-002	209.00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	209.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	389.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	769.00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	189.00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	329.00
LTE LITE 425C/33C/25E/25L	16Meg Module	142337-004	639.00
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Contura 320, 325	2Meg	139497-001	99.00
	4Meg	139498-001	189.00
	8Meg	139499-001	339.00
Contura 400, 410	4Meg/8Meg/16Meg		199/389/709
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Aero 4/25, 4/33L	4Meg	190532-001	184.00
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T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	359.00
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	189.00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	359.00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	689.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	199.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	389.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	769.00
T4700, 4800, 4850 (Hard Drive)	524Meg/710Meg		949/1149
T3400CT, T2400, T3600	4Meg	PC-PA2019U	194.00
T3400CT, T2400, T3600	8Meg	PC-PA2020U	359.00
T3400CT T2400, T3600	16Meg	PC-PA2021U	707.00
T3400CT	32Meg		1549.00
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T3200SX	2Meg	PC12-PA8307U	55.00
T3200SX	4Meg	PC12-PA8909	199.00
T5200/T8500	2Meg	PC10-PA8304U	114.00
T5200/T8500	8Meg	PC10-PA8313U	419.00

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ACER 750	4Meg/8Meg/16Meg		199/459/799
ALR Venture	4Meg	12407980	249.00
Altima Virage	4 Meg/ 16 Meg		199/679
Altima Virage II	4Meg/8Meg/16Meg		199/389/679
AST Ascentia 900N, 800N	4Meg/8Meg/16Meg		199/379/679
AST Bravo & Explorer	4Meg/16Meg	501255-001, -002	189/679
AST Notebook Prem Exec 388SX/20/25/25L	4Meg	500814-003	189.00
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	501166-001, -003	199/699
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	194/769
AT&T Globalyst 200	4Meg/8Meg/16Meg		199/389/679
AT&T Safari NSX/20	4Meg	PEC 37651	259.00
Austin DX4, DX2, SX2, SX Series	4Meg/16Meg		Call
Bondwell B310, Plus	1Meg	23050-09100	69.00
Bondwell B310V, SX	1Meg		109.00
Bondwell B310V, SX	4Meg		229.00
Canon Innova Book 150	4Meg/16Meg		199/769
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Canon Innova 486-10	4Meg/16Meg		189/829
Canon Notejet 486	4Meg/ 8 Meg		199/389
Chaplet 486	4Meg/16Meg		199/679
Chicony N85	4Meg/16Meg		199/679
Compuadd 425TX Notebook	4Meg/16Meg		Call
Contura 410c & cx	4Meg/8Meg/16Meg		199/389/679
Dell Latitude M, MC, MCX	4Meg/8Meg/16Meg		219/449/719
Dell Latitude XP, 475, 4100, 4100CX	4Meg/16Meg		199/649
Dell Latitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		199/679
DTK 4T100P Notebook	4Meg/8Meg/16Meg/32 Meg		Call
Epson ActionNote 650, 650c	4Meg/8Meg/16Meg		209/399/659
Epson ActionNote 700, 700c, 700cx	4Meg/16Meg		199/639
Epson ActionNote 4000 Notebook	6Meg		Call
Epson ActionNote 4LC/25, 4LC/33, 4SLC/2-50			Call
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	109.00
Gateway 2000 Colorbook 4/33	4Meg/16Meg		199/679
Gateway 2000 Nomad 425 DXL/SXL	4Meg/16Meg		199/1199
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Lexmark SE10	4Meg/8Meg		209/399
Magnavox Metalis	1Meg/4Meg	288, 386SX	109/199
Midwest Micro Elite SX-25, SX33, DX2-50, DX2-66	4Meg/8Meg/16Meg		199/389/679
Midwest Micro Elite 486 SLC 33 Subnotebook	4Meg/8Meg/16Meg		109/199/299
Midwest Micro Elite Sndbk SX33, DX3-50, DX4-75 DX4-100	4Meg/8Meg/16Meg		199/389/679
Midwest Micro Elite Sndbk Plus D5-75, D5-90	4Meg/8Meg/16Meg		199/389/679
NCR Safari 3180	4Meg/ 8 Meg		239/449
NEC Prospeed 386	2Meg	PC31-21	119.00
NEC Prospeed 386	8Meg	PC31-22	399.00
NEC Prospeed 286, 386SX-16, 386SX-20	4Meg	PC21-22, PC43-22	199.00
NEC Ultralite Versa, E, V	4 Meg/8Meg/16Meg/20Meg	DP4104	183/359/739/919
NEC Versa Removable Hard Drive	340Meg/524Meg/710Meg		749/899/1049
NEC Versa S	4Meg/8Meg/16Meg		209/379/799
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	109/199
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Panasonic CF170, CF270, CF370	1Meg	CF-8A165	59.00
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Twinhead Slimnote 5	4Meg/8Meg/16Meg		199, 379, 649
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Zenith Master Sport SL, SLE, 600, 620, 625NL	2Meg	ZA-4-4	119.00
Zenith Super Sport 286, 286E	1Meg	ZA-180-66	99.00
286E, SX	2Meg	ZA-180-64	149.00
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Canon LBP 860	–	–	–	99	–	–	179	–	–	349	669	1249
Canon LBP4, 4Lite, 4plus	–	–	159	219	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	139	–	–	229	–	–	–	–	–
Epson Action Laser 1100, 1600	–	–	69	99	–	–	189	–	–	379	599	–
Epson Action Laser II	–	–	89	–	208	–	–	327	–	*IN STOCK		
Epson 8000	–	–	89	–	208	–	–	327	–			
Epson 1000, 1500, 5000, 5200	–	–	–	*119**	–	–	*238**	–	*Call*	–	–	–
HP 2, 2D–	–	–	–	109	–	–	189	–	–	–	–	–
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HP 4, 4M, 4SI, 4SIMX, 4P, 4MP	–	–	–	89	–	–	169	–	–	349	–	–
HP 4L	–	–	59	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	69	–	–	–	169	–	–	349	–	–
HP 4SI	–	–	–	89	–	–	175	–	–	349	–	–
HP Design Jet 600, 650, 200	–	–	–	89	–	–	175	–	–	349	–	–
HP Deskjet 500, 500C, 510, 550,560	–	55	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	89	–	–	175	–	–	349	–	–
HP Paintjet XL300	109	–	–	–	–	–	289	–	–	469	837	–
IBM Laser 4019, 4019E	–	–	–	–	–	169	–	–	–	–	–	–
IBM Laser 4029 4037	–	–	–	–	–	–	169	–	–	–	–	–
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Konica LP-3110	–	–	119	189	239	–	–	–	–	–	–	–
NEC 90, 290	–	–	–	139	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	99	–	–	–	–	–	–	–	–
Oki 400	–	–	–	84	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	135	189	–	–	–	–	–	–	–	–
Oki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
Packard Bell P8 9500	–	–	–	139	–	–	227	–	–	–	–	–
Packard Bell 9815	–	–	–	159	–	–	269	–	–	–	–	–
Panasonic 4420/4450I	–	–	–	129	–	–	229	–	–	–	–	–
Panasonic 4410/4430	–	–	–	126	–	–	195	–	–	–	–	–
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Sharp 9400, 9460, 9600, 9700E	–	–	89	149	–	–	249	–	–	–	–	–
Sharp 9500, E, H, 9700, H	–	–	109	–	–	–	279	–	–	–	–	–
TI XL/PS17/PS35	–	–	55	–	–	–	–	–	–	–	–	–
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- ✓ Macro ability.
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- ✓ Context sensitive help-one key help that the user can modify.
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- ✓ Complete posting audit trail.
- ✓ Easily upgrades to networks.
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- ✓ Allows up to 15 alphanumeric characters for account numbers in all modules.
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GENERAL LEDGER

- User-defined numbering of accounts with up to 15 alphanumerics.
- Allows multiple departments.
- Allows transaction posting to prior or future financial periods.
- Standard G/L financials provided.
- G/L Report Writer with which user can design up to 250 financial reports per company.
- Allows recurring journal entries.
- Allows multi-company ledgers with or without consolidation.

ACCOUNTS RECEIVABLE

- Allows open item or balance forward accounting.
- Allows recurring transactions.
- Prints user-defined or plain paper statements.
- Handles cash receipts or partial payments.
- Ages receivables with user-defined periods.
- Prints mailing labels, 1 to 4 across.
- Payments can apply to up to 250 invoices.
- Provides aged reports by payment date.
- Customer file show: Credit limit, collection status, finance charge, YTD charges and YTD payments.
- Reports can be sorted by: customer number, customer name, customer type, zip code, salesperson code or biller code.

ACCOUNTS PAYABLE

- Prints checks.
- Calculates early payment discounts.
- Ability to distribute to 250 G/L expense accounts per invoice.
- Cash flow analysis/forecast.
- Allows entry of prepaid invoices to be expended later.
- Prepares check register of all payment transactions.
- Accounts for prepaid expenses (i.e. insurance).
- Allows immediate checks (handwritten or printed).
- Provides aged reports by payment date.
- Prints 1099's miscellaneous.
- Checks for duplicate transactions.
- User can define up to nine check formats.

ORDER ENTRY

- Allows adding stock items and customers on the fly.
- Allows real-time update of inventory.
- Invoice for sales and/or service (allows billing for non-stock, special order items).
- Complete detail sales reports with user-defined sorts.
- Hold order feature (quotes on unfilled orders).
- Allows customer credit limits and alerts to exceeded limits.
- Allows for cost of non-inventory and special orders.
- User-defined tax sales rates.
- Produces back-order report by customer.
- Displays customer balance during invoicing.
- Allows recurring invoices.
- Allows price-level lookup during invoicing.
- Over 15 order entry reports (sales analysis, history, etc.).

PURCHASE ORDER

- Add vendors and inventory on the fly.
- Generates purchase orders from understock inventory items.
- Tracks multiple vendors for each stock item.
- Lists economical order quantity.
- Allows reprinting of purchase order.
- User-defined purchase order formats.
- Tracks promised date vs. actual date; quoted cost vs. actual cost.

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- Sorts checks by number, date, payee, vendor or employees.

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- Lookup by number or description.
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- Supports up to five quantity price/break price/levels on each item.
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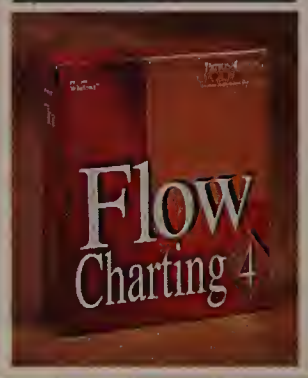

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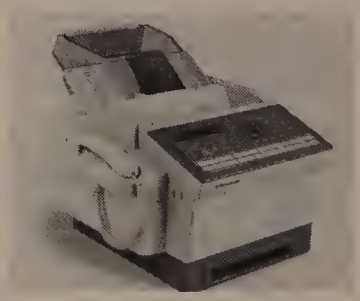

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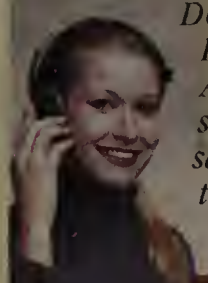

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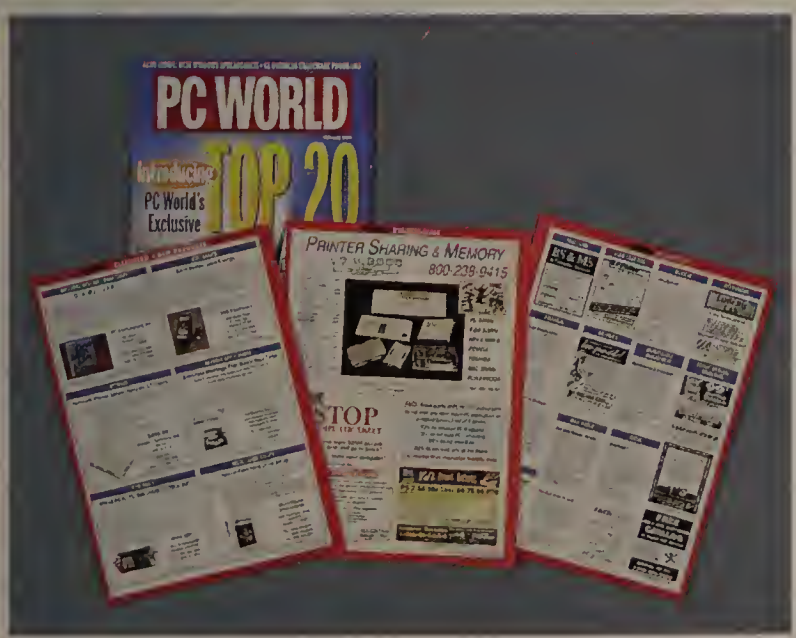

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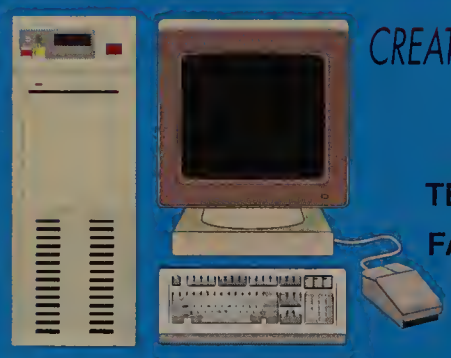

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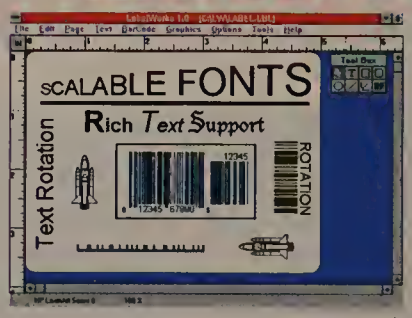

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FACT: 73% of PC WORLD subscribers use Windows!

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CIRCLE 508 ON READER SERVICE CARD

FACT: 84% of PC WORLD'S employed subscribers are managers.

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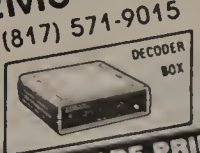

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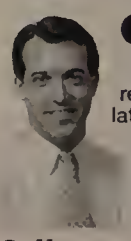

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CIRCLE 441 ON READER SERVICE CARD

FACT: 84% of PC WORLD'S employed subscribers are managers.

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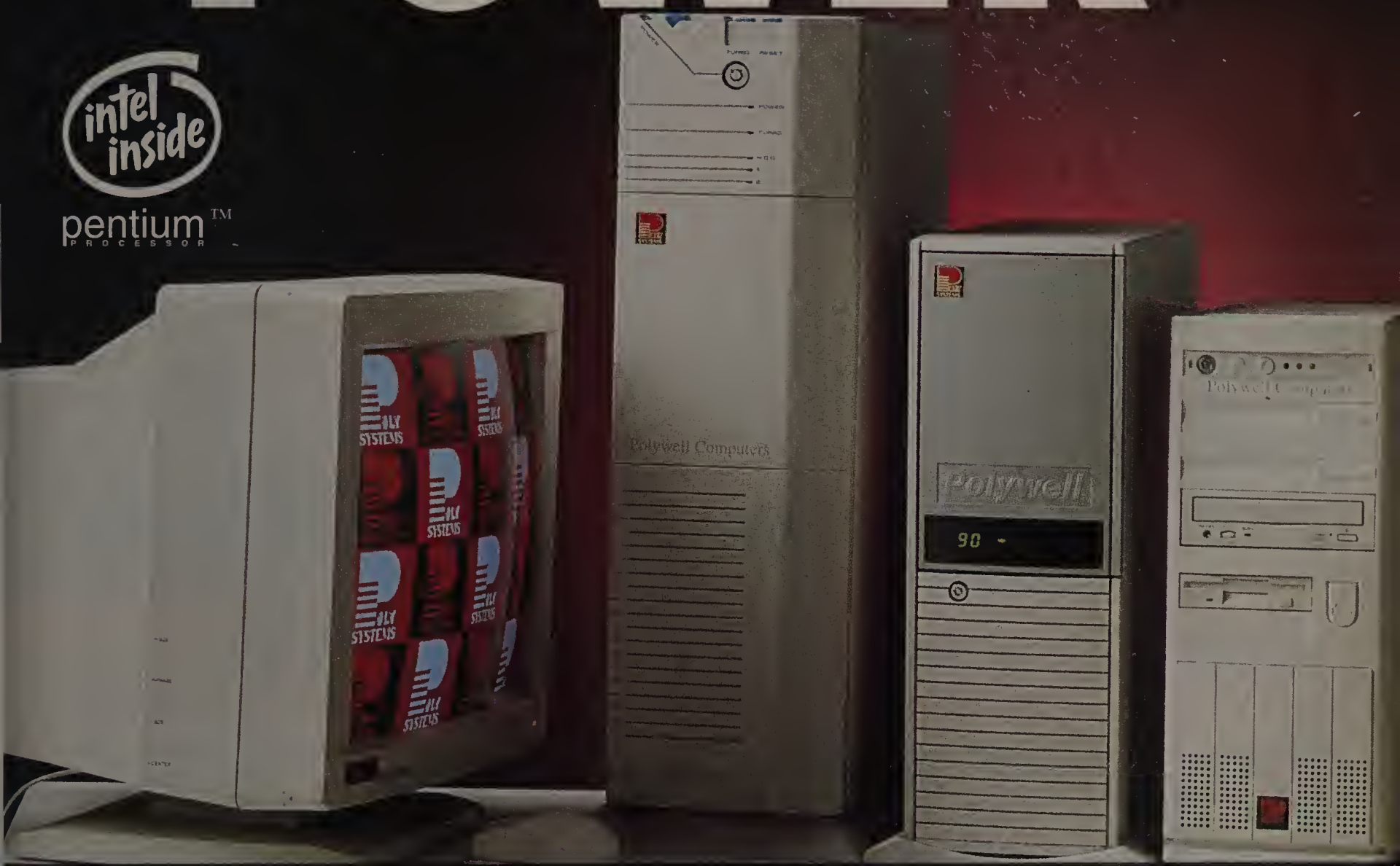

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Processor	Screen	Hard Drive	Price
486DX4/75	9.5" Dual Scan	340MB	$3129
486DX4/75	9.5" Dual Scan	510MB	3499
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486DX2/50	8.4" Active	340MB	3099
486DX2/50	8.4" Active	540MB	3449

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486DX2/50	10.3" Dual Scan	520MB	3199
486DX2/50	10.4" Active	340MB	3769
486DX2/50	10.4" Active	520MB	4129
486DX4/100	10.3" Dual Scan	340MB	3169
486DX4/100	10.3" Dual Scan	520MB	3999
486DX4/100	10.4" Active	340MB	4489
486DX4/100	10.4" Active	520MB	4829

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Processor	Screen	Hard Drive	Price
486DX2/50	8.5" Dual Scan	170MB	$2549
486DX2/50	8.5" Dual Scan	260MB	2829
486DX4/75	8.5" Dual Scan	170MB	3099
486DX4/75	8.5" Dual Scan	260MB	3379

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486DX2/66	4MB	540MB
486DX2/66	8MB	540MB
Pentium 75MHz	8MB	540MB
Pentium 75MHz	8MB	1GB
Pentium 90MHz	8MB	1GB
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- ▲ PanVision graphics for up to 1024x768 resolution
- ▲ 2 Type II or 1 Type III PCMCIA slot

Processor	Screen	Hard Drive	Price
486DX2/50	10.3" Dual Scan	340MB	$2749
486DX4/75	10.3" Dual Scan	510MB	3149
486DX4/75	10.4" Active	510MB	4129
486DX4/75	10.4" Active	700MB	4519

Ascentia 910N 10.4" Active Matrix screen

Ascentia 810N

- ▲ LARGE, 10.4" Dual Scan displays
- ▲ 4MB RAM expandable to 20MB
- ▲ Removable hard drive and floppy drive
- ▲ 2 Type II or 1 Type III PCMCIA slot

Model	Screen	Hard Drive	Price
486DX2/66	10.4 Dual Scan	250MB	$23[illegible]
486DX2/66	10.4 Dual Scan	340MB	25[illegible]
486DX2/66	10.4 Dual Scan	510MB	26[illegible]

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Processor	Screen	Hard Drive	Price
486DX4/75	10.4" Dual Scan	500MB	$3639
486DX4/75	10.4" Active	500MB	4749

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Processor	Screen	Hard Drive	Price
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T2400

	Model	Processor	Screen	Hard Drive	Price
	T2100	486DX2/50	9.5" Mono	250MB	$1439
	T2100	486DX2/50	10.4" Dual Scan	330MB	2249
	T2100	486DX2/50	8.4" Active	330MB	3099
Pro Series	T2400	486DX2/50	9.5" Dual Scan	250MB	2279
Pro Series	T2400	486DX2/50	9.5" Dual Scan	320MB	2449
Pro Series	T2400	486DX2/50	8.4" Active	250MB	2889
Pro Series	T2400	486DX2/50	8.4" Active	320MB	2949
Pro Series	T2450CT	486DX4/75	9.5" Active	320MB	3899
Pro Series	T2450CT	486DX4/75	9.5" Active	500MB	4199

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- ▲ MS-DOS, Windows for Workgroups 3.11, UltraFont, Indeo video compression software

Model	Processor	Screen	Hard Drive	Price
T4700	486DX2/50	9.5" Active	320MB	$2999
T4800	486DX4/75	9.5" Active	500MB	4189
T4850	486DX4/75	10.4" Active	500MB	4519
T4850	486DX4/75	10.4" Active	772MB	4829
T4900	Pentium 75	10.4" Active	772MB	5499

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Processor	Screen	Hard Drive	Price
486DX4/75	9.5" Dual Scan	340MB	$3219
486DX4/75	9.5" Active	540MB	4199
486DX4/75	9.5" High Res.	540MB	4589
486DX4/100	9.5" Active	810MB	5049
Pentium 75	9.5" Active	340MB	4729
Pentium 75	9.5" Active	540MB	5099
Pentium 75	9.5" High Res.	540MB	5479
Pentium 75	9.5" Active	810MB	5599
Pentium 75	9.5" High Res.	810MB	5989

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Processor	Screen	Hard Drive	Price
486DX2/50	9.5" Dual Scan	250MB	$2369
486DX2/50	9.5" Dual Scan	340MB	2499
486DX2/50	9.5" Active	250MB	2889
486DX2/50	9.5" Active	340MB	3029
486DX2/50	9.5" Active	540MB	3399
486DX4/75	9.5" Active	340MB	3399
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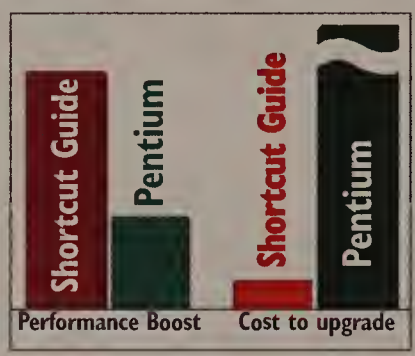

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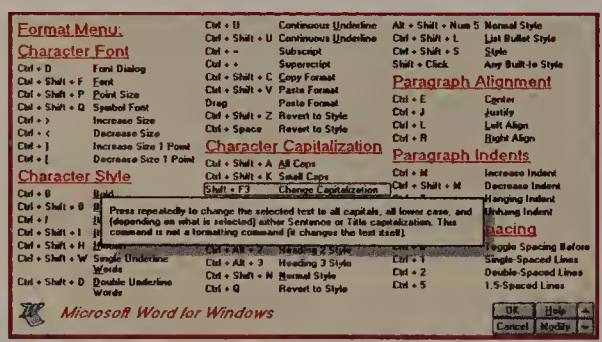

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953 OTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
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Black Holes Ain't So Black

The interactive, Windows-based CD-ROM edition of *A Brief History of Time,* physicist Stephen Hawking's best-selling book on high-level cosmology, is the first CD-ROM version of a book that's as good as the original—or even better.

Hawking's text is all here, but reading it is just one option. You can also listen to Hawking read it while you view photos, slides, animations, even Monty Pythonesque illustrations such as an infinite tower of tortoises. Or take a walk down Relativity Street, a picture gallery of scientists, where you can click on Einstein's picture and get either Hawking's explanation of relativity, Einstein's account of how he got the idea, or a clip from Nicholas Roeg's film *Insignificance* in which Marilyn Monroe explains the concept to Einstein. This slapstick hypertext artifact is utterly brilliant and enchanting.

Not Yet as Famous as Will Durant

Larry Gonick's seven-volume Cartoon History of the Universe covers 13 billion years, and it's one of the glories of the late twentieth century. Doubleday published Gonick's comic books in a collection, and the multimedia, Windows-based CD-ROM version adds voice-over narration, clever animation, computer games, and something his comics have always needed—an index.

Gonick is known for his stupendous research. Not only does he read widely, but he consults a range of sources for broader political perspectives and scientific commentary. Best of all, his playful sense of humor enlivens even the deepest explorations of religion, technology, and sociology.

The CD-ROM edition is even funnier than the original comics. Almost every frame is animated, and multimedia options underline the gags. Some of the best bad jokes are even marked with the traditional drumroll and cymbal crash.

Looking At Another Digital Encyclopedia

Two months ago I reviewed the 1995 editions of Microsoft Encarta and Compton's Interactive Encyclopedia. Grolier has released its 1995 version, and when it comes to breadth of content it's the winner, boasting solid listings on just about everyone, from car racing ace A.J. Foyt to *Star Trek* founder Gene Roddenberry.

Unfortunately, once you get past its impressive list of subjects, the Grolier encyclopedia doesn't look that great. Entries are short—seldom more than two paragraphs—and multimedia features are thin. Audio and video selections are severely limited—the entries on jazz masters Charlie Parker and Duke Ellington don't offer any music at all, and animations are few and far between. Encarta 95 is still the best digital encyclopedia around.

The Catbird Seat

In spring, every good American's thoughts turn to baseball—or at least they used to, before football took over as the favorite sport. I doubt HardBall 4, a fine new baseball simulation from Accolade, will turn that trend around, but it's a pretty good start.

Whether you feel like leading a team to victory in the World Series, swinging at a slider and sending it out of the park, or watching a great baseball game on your PC, HardBall 4 makes it possible. You can pitch, bat, and field, or let the computer do it for you; and you can play in 28 realistically rendered ballparks. Graphics are first-rate, digitally animated from rotoscopes of real players. The display swaps perspectives automatically to follow the action, and includes inset close-ups and a full range of TV-style special effects—even instant replay. Sportscaster Al Michaels' play-by-play commentary adds to the fun, and considering that the voice-over is synthesized based on your decisions and random chance, it's pretty fast and seamless.

HardBall 4 sends it out of the park.

Relativity is a perfect subject for a free-wheeling hypertext program like A Brief History of Time.

Joys of the Grape

Anyone can taste wine. You open your mouth, take a sip, and your taste buds go to work. But knowing what you're tasting and learning how to talk about it is another story. *Food and Wine*'s Wine Tasting, a Windows-based CD-ROM, is a tasty way to get up to speed.

At the center of the program is a series of 48 tastings. Naturally, the wines are not included, but full information on how to get them is provided. Once

By Michael Goodwin

VINTAGE PHOTOS AND A WALKING TOUR of a new frontier town are just part of the fun in Wyatt Earp's Old West.

you've read through chapters on grape varietals, wine-growing regions of the world, and wine making, the program steps you through a series of detailed tasting checklists. For instance, under bouquet (or aroma) there are over 11 different categories to consider (nuts, florals, spices and herbs, sugars, and so on).

When you've finished entering data, you compare notes with resident wine taster Steve Olson. There are even instructions on how to host a wine-tasting party. Delicious.

End of the Line, Cowpoke

Wyatt Earp's Old West is a peculiar combination of a frontier-town walking tour, a photo gallery, and an arcade game where you square off against a mechanical gunfighter. You explore the streets of a Western town in this Windows-based CD-ROM. Click on stores, hotels, and restaurants to view old photos, while a narrator explains what frontier life was like. There's even a printed glossary to explain terminology. When you get tired of the tour, you can try your luck in an Old West shoot-out. If you lose—and you probably will, since the bad guys have no compunctions about ganging up on you—you'll wake up in Boot Hill to the narrator's greeting: "End of the line, cowpoke."

Wyatt Earp's Old West isn't a total waste of time, but I found it underwhelming. For $50 you can shoot a lot of bandits at the local games arcade—or buy a good book on the Old West.

- **1995 Grolier Multimedia Encyclopedia** $149.95; Grolier Electronic Publishing; 800/285-4534
  Reader service no. 689
- **A Brief History of Time** $59.95; Creative Labs; 800/998-5227, 408/428-6600
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- **The Cartoon History of the Universe** $34.95; Putnam New Media; 703/860-3375
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- **Food and Wine's Wine Tasting** $59.95; Times Mirror Multimedia; 800/747-1787
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- **HardBall 4** $59.95; Accolade; 800/245-7744
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- **Wyatt Earp's Old West** $49.95; Grolier Electronic Publishing; 800/285-4534
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Michael Goodwin is a contributing editor for PC World. ■

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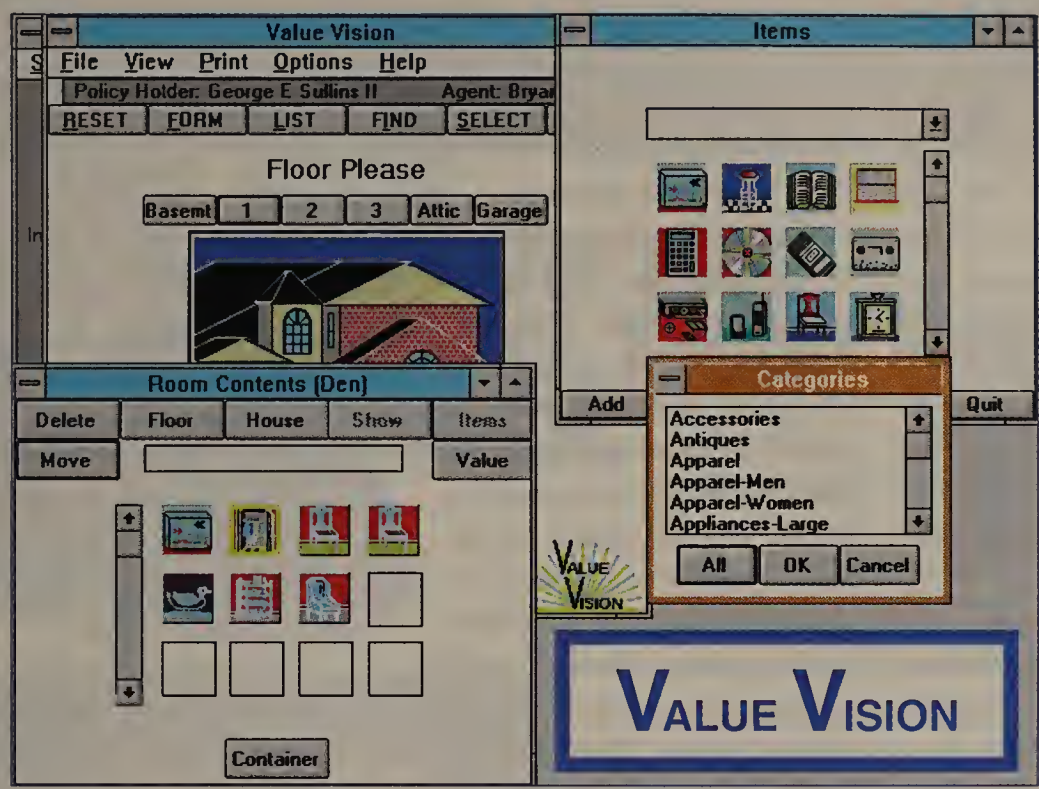

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P505

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Old Dog, New Tricks

I'll come clean: I'm not as bright as I look. Sure, put me in a suit and tie and I give a good impression of intelligence (my editor's been fooled for years). But honestly, I'm a slow learner. I needed tutors in high school and struggled through graduate school, spending most of my time studying while everyone else was partying. Maybe I would have enjoyed myself more if I had had a computer.

See, over the past year, I've discovered some pretty cool software that makes learning an adventure. And I'm doing things I never imagined possible.

Playing to Type

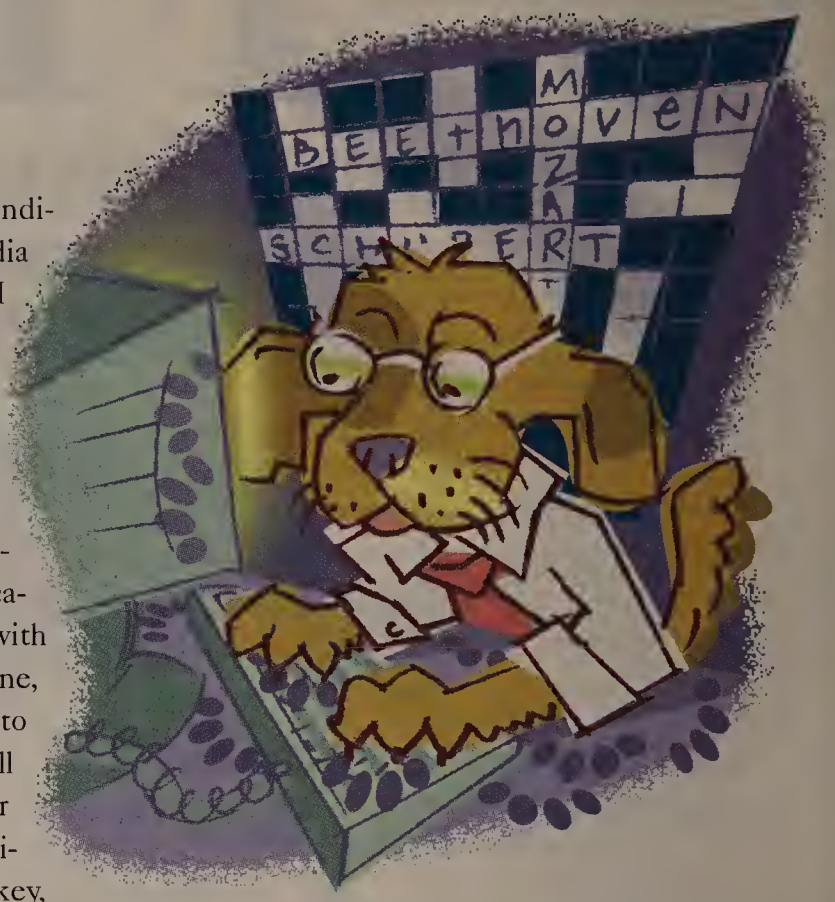
Like learning to touch-type. Believe me, hunting and pecking really slows me down. And listen, I'm not alone: An informal poll at a recent Pasadena Users Group meeting of some 600 people showed that almost 400 of them—about 66 percent—couldn't touch-type. (My wife, a microbiologist, did the math for me.)

I found almost a dozen typing programs on the market, but just two won my affection. For my money, MasterMind Typing, a $29.95 shareware program with a meat-and-potatoes, no-frills approach, is the winner. The interface is quirky (it avoids Windows standards by a mile), but MasterMind is a masterful teacher. The program watches me type and, with remarkable intuition, introduces new keys only when I'm ready. If I goof up, MasterMind gets me back on track. The on-screen keyboard and hands keep me informed of my position, and help hints are a keystroke away. It's shareware, so there's a copy waiting for you to try out—as mmtype.exe—on PC World Online in CompuServe and America Online forums.

By Steve Bass

Multimedia Keystrokes

On the sizzle side, there's Individual Software's Multimedia Typing Instructor, a CD-ROM that dresses up its typing lessons with an abundance of three-dimensional graphics, music, animation, and games. The program uses an airport metaphor, complete with "in-flight movies" about key location, and a "magazine rack" with articles on sports, law, medicine, and a number of other topics to practice on. And while doing all that, I can listen to jazz or classical music. The two multimedia games, although hokey, provide me with a break from the regular lessons. The street price of Typing Instructor is surprisingly low—about $30 (as cheap as shareware).



JOE VANDERBOS

Roll Over, Beethoven

I'm learning to type and improving my vocabulary, but am I appreciating the finer things in life? That's where Microsoft Composer Collection comes in.

Composer is a collection of three CD-ROMs highlighting Beethoven's Ninth Symphony, Mozart's Dissonant Quartet, and Schubert's Trout Quintet. The CDs are also available individually—as Multimedia Beethoven, Mozart, and Schubert—so you can stick to your favorite composer.

After only a few short minutes of exploring, I was hooked. Each disk takes me on a tour of the specific work—and I can choose either an in-depth journey or a quick walk-through.

What's neat is the way these CD-ROMs help me understand not only the music, but also the composers and their relationship to their era, all with stunning sound and graphics. Not to worry, the programs are anything but dry: They're put together with a good balance of seriousness and lighthearted, charming commentary. And I love being able to go along at my own pace, never feeling rushed, and to repeat segments I really enjoyed as well as any I didn't understand the first time.

You know, when I was a kid, I was the guy stuck cleaning the erasers after class. But now, I'm the brightest guy in the office.

- **MasterMind Typing** registration fee $29.95; Peter Turnquist; 800/242-4775, 510/210-1603
  Reader service no. 674
- **Microsoft Composer Collection** price about $80, individual titles $60; Microsoft; 800/426-9400, 206/882-8080
  Reader service no. 676
- **Multimedia Typing Instructor** street price $29.95; Individual Software; 800/822-3522, 510/734-8337 (fax)
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PC World *Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 12 for contact information.*

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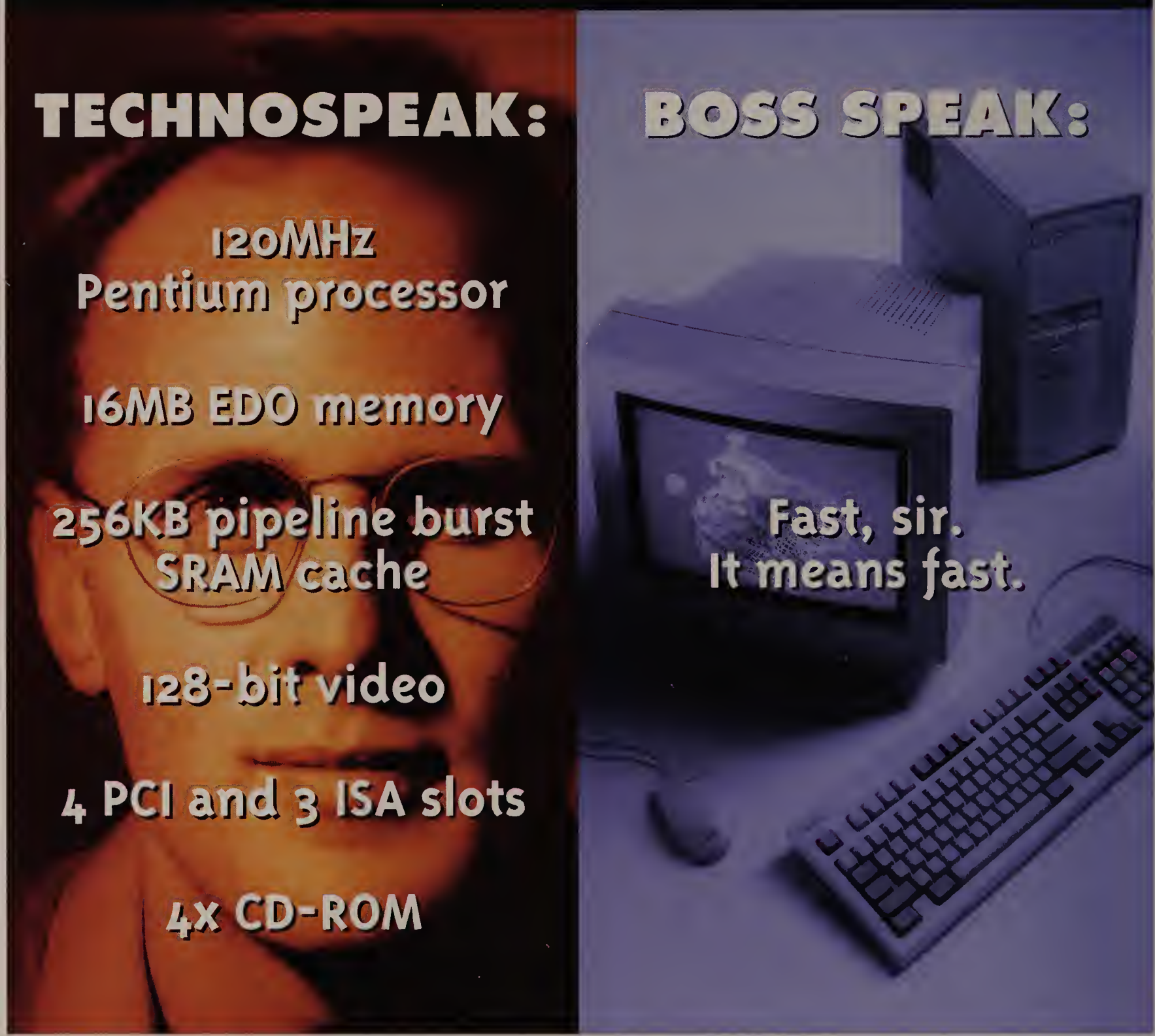

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